the OIL AND GAS JOURNAL

Fighting now for Victory
STA-VOL-ENE
STABILITY ◆ VOLATILITY ◆ ENERGY
IT'S A "NATURAL"
IS READY FOR THE HIGHWAY
With Peace
STA-VOL-ENE the "Natural" known throughout the World, partner of the automobile, helped give us the American-Way of Life—is doing more in helping preserve that freedom . . . with Peace will be ready for the highway, contributing much to the many new developments forecast for tomorrow.
Hanlon-Buchanan, Inc
PIONEER NATURAL GASOLINE MANUFACTURER
EXPORT TERMINALS:
Goodhope, La. Corpus Christi, Tex.
Houston, Texas Texas City, Texas
Baytown, Texas Galena Park, Texas
TULSA 1, OKLAHOMA
NATIONAL BANK OF TULSA BUILDING
PHONE 4-1101 or L.D. 358 WIRE — OR WRITE P. O. BOX 1559
Cable Address— STAVOLENE, Tulsa, U. S. A.
FOREIGN REPRESENTATIVE:
Barks, Williams & Co., Ltd.
4 Lloyd's Ave.
London, England

PRICE 20 CENTS

AUGUST 5, 1944

. . . Dawn of the era that changed the meaning of the word *Rubber!*

● *The three 9,500-bbl. acid tanks shown in the view directly above and the storage tanks in the general view at the top of the page are a part of the storage facilities at a large butadiene plant. The tanks shown in the general view range in size from 12 ft. in diam. by 24 ft. to 30 ft. in diam. by 30 ft.*

WHEN America's synthetic rubber plants swung into all-out production, the meaning of the word *rubber* changed. No longer is this term used to describe a single substance of natural origin. It is now the designation for a variety of flexible, elastic materials.

The production rate of today's synthetics is governed largely by the production rate of their components. Butadiene, for example, must be produced in tremendous quantities to make the necessary tonnage of GR-S type synthetic rubber. In maintaining a steady flow of butadiene to the compounding plants it is essential to provide adequate storage facilities at various steps in the production lines. We installed all of the storage tanks at the plant shown above, where butadiene has been produced since 1941.

Our plant facilities are keyed to the designing and fabricating of all types of storage tanks including Hortonspheres and Hortonspheroids . . . which are being used for storing charging stock and other volatiles under pressure, for the nation's synthetic rubber industry and aviation gasoline plants.

Let us know your storage problem . . . write our nearest office outlining your requirements.

CHICAGO BRIDGE & IRON COMPANY

BIRMINGHAM • CHICAGO • CLEVELAND • HAVANA • HOUSTON
NEW YORK • PHILADELPHIA • SAN FRANCISCO • TULSA • WASHINGTON

the OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE ST., TULSA, OKLAHOMA

Subscription price, United States and foreign, 1 year, $6.00; 2 years, $10.00; 3 years, $12.00; 5 years, $15.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1944, by The Petroleum Publishing Co.

Vol. 43, No. 13 August 5, 1944

P. C. LAUINGER, *President* — C. O. WILLSON, *Editor*

S. H. ROURKE, *Business Manager* — H. STANLEY NORMAN, *Managing Editor*

R. C. MAC DOUGALL, *Circulation Manager* — ARCH L. FOSTER, *Refining Editor*

W. L. NELSON, *Technical Editor* — PAUL REED, *Pipe-Line Editor*

Associate Editors

LYNN M. NICHOLS — NEIL WILLIAMS

CHARLES J. DEEGAN

District Editors

JAMES McINTYRE, Tulsa 1, 211 S. Cheyenne Ave. — THOMAS F. SMILEY, Tulsa 1, 211 S. Cheyenne Ave.

TOLBERT R. INGRAM, Denver 2, State Office Bldg. — E. H. SHORT, JR., Houston 2, Sterling Bldg.

HENRY D. RALPH, Washington 4, Natl. Press Bldg. — L. P. STOCKMAN, Los Angeles 14, Union Oil Bldg.

JOHN P. O'DONNELL, New York 17, 415 Lexington Ave. — O. C. PRESSPRICH, Saginaw, News Bldg.

VICTOR LAURISTON, Chatham, Ont., 35 Stanley Ave. — A. C. MacINTYRE, Oil City, Derrick Bldg.

R. B. TUTTLE, *Refinery Engineering Staff*, Tulsa 1, 211 S. Cheyenne Ave.

Advertising

E. KLAPPENBACH, *Vice President*

KENNETH J. LANGLEY, *Eastern Manager*, New York 17, 415 Lexington Ave. — CRAIG ESPY, *Pittsburgh Manager*, Pittsburgh 19, Grant Bldg.

C. R. FARMER, *Chicago Manager*, Chicago 2, 105 W. Madison — J. HOWARD TINKHAM, *California Manager*, Los Angeles 15, 1400 S. Grand Ave.

WAYNE RIVES, *Gulf Coast Manager*, Houston 2, Sterling Bldg. — A. J. CHAMBERS, Twickenham (Middlesex) England, 72 Cole Park Road

MITCHELL TUCKER, *Manager, Research Dept.*, Tulsa 1, 211 S. Cheyenne Ave. — JOHN D. REILLY, *Production Manager*, Tulsa 1, 211 S. Cheyenne Ave.

Member
Audit Bureau of Circulations
Associated Business Papers

Table of Contents

NEWS DEVELOPMENTS

Permanent Committee May Maintain Open-Door Policy 28
Phillips Leases Colombian Tract 28
DSC Promises Subsidy Payments on OPA-Approved Oil 29
State Pool Boundaries to Prevail 29
Corrections Made in OPA List of Pools 29
FEA Confirms Oil Shortage in Reich 30
Elk Hills Crude Put Up for Bids 30
California Drilling Campaign Will Continue Postwar 32
Motor-Fuel Demand 17 Per Cent Greater 32
Tank Cars Diverted From Asphalt Service 33
A.P.I. Postpones Annual Meeting 33
Vital Compressing Station Restored With Little Lost Time 34
Senate Committee Finds Industry Doing Good Job 36
Condensate Corrosion Study Launched 37
Geologic Aspects of Wyoming and Outlook for Development 38

Trends 27
This Week 31
Editorial 35
Deaths 42
Natural-Gas News 79
Recycling News 79
Refining News 82
Pipe-Line News 86

ENGINEERING AND OPERATING

Multiple Sands Complicate Completion Problems in Eucutta 43
Handling Sour Gas at High Pressures 47
Abstracts of Technical Literature 50
Cementing Method Seals Perforations in Deep Wells 53
Hawkins Plant Recovers High-Purity Isoparaffin 57
Champlin Plant Exceeding Designed Alkylate Capacity 67
Practical Refinery Engineering—7 Heat Transfer Film Coefficients; Steam Condensing on Outside of Horizontal Tubes 76

Questions on Technology 54
Plant Practices 64
Eng. Fundamentals 73
The Refiner's Notebook 75

EXPLORATION AND DRILLING

Week's Highlights 89
Completions in All Areas 89
Reports by Areas Start on Page 90
Daily Average Production for Week 90
Wildcat Completions and Discoveries 108

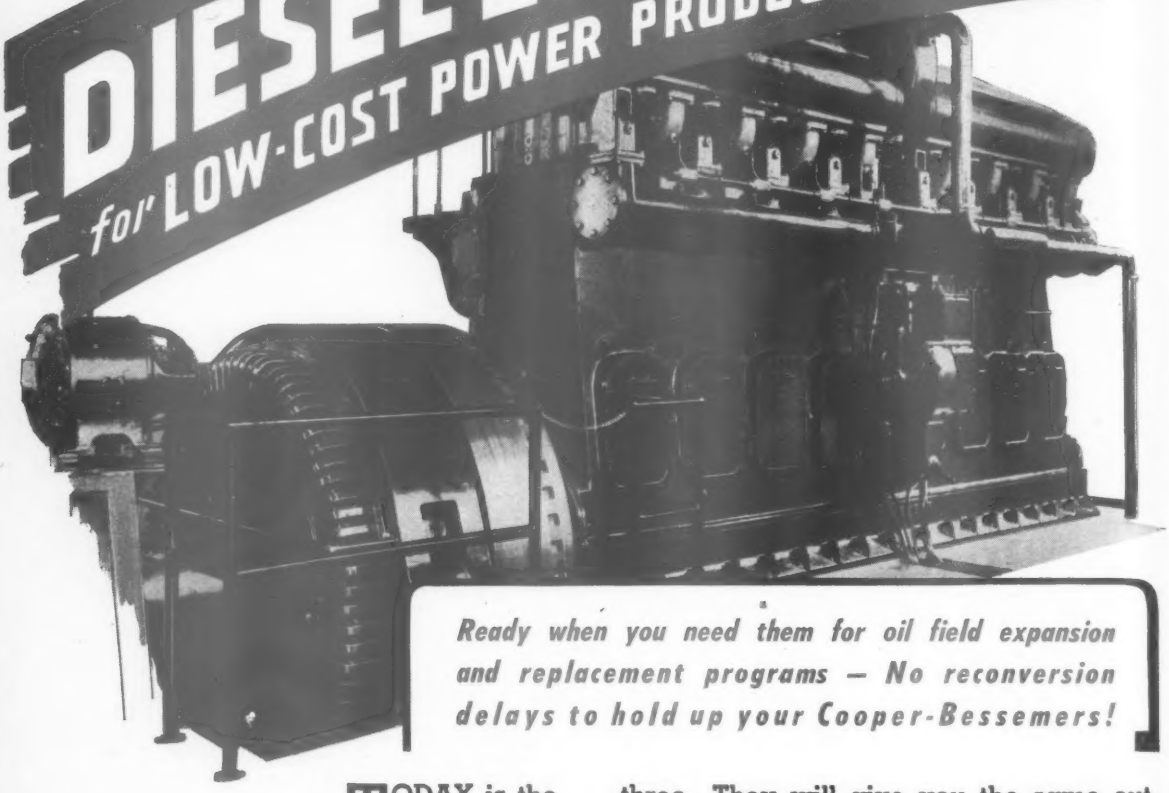
ADDITIONAL FEATURES

Drilling Contractors 102
Market Summary 103
Crude-Oil Prices 103
Calendar of Events 103
Personals 104
Equipment Progress 107
Classified Advertising 109
Index to Advertisers 112

Order NOW

DIESEL ENGINES

for LOW-COST POWER PRODUCTION .....

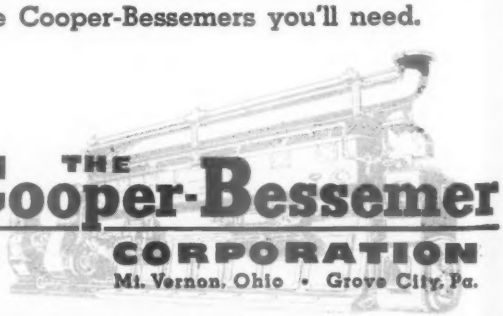


Ready when you need them for oil field expansion and replacement programs — No reconversion delays to hold up your Cooper-Bessemers!

TODAY is the time to talk about your immediate and future power requirements . . . about efficient, reliable Diesel power for pumping, for drilling, for generating electricity. Now is the time to determine just what you need and take steps to get your engines earmarked for quick delivery.

The amazing performance of Diesels in wartime service of every kind is making power history. The Cooper-Bessemer engines you get now are all the better for our war experience. They benefit by the concentration of ten years' normal engineering development crowded into two or three. They will give you the same outstanding service that these Diesels are delivering today on the fighting and critical production fronts.

So let's make a start on your present or future problem now. Ask for our representative to sit down with you at your convenience, to determine what type and size Cooper-Bessemers you'll need.



THE Cooper-Bessemer CORPORATION

Mt. Vernon, Ohio • Grove City, Pa.

New York, Washington, Houston, Dallas, Tulsa, Shreveport, Los Angeles, St. Louis, Seattle

BUILDERS OF DEPENDABLE ENGINES FOR 111 YEARS

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States — Page 90

CRUDE-OIL STOCKS 225,294,000 bbl. as of July 22—down 1,219,000 bbl. One year ago 237,279,000 bbl.

GASOLINE STOCKS 82,150,000 bbl. as of July 22—down 102,000 bbl. One year ago 74,356,000 bbl.

RESIDUAL FUEL-OIL STOCKS 55,315,000 bbl. as of July 22—up 983,000 bbl. One year ago 67,161,000 bbl.

GAS OIL AND DISTILLATE STOCKS 37,513,000 bbl. as of July 22—up 342,000 bbl. One year ago 33,863,000 bbl.

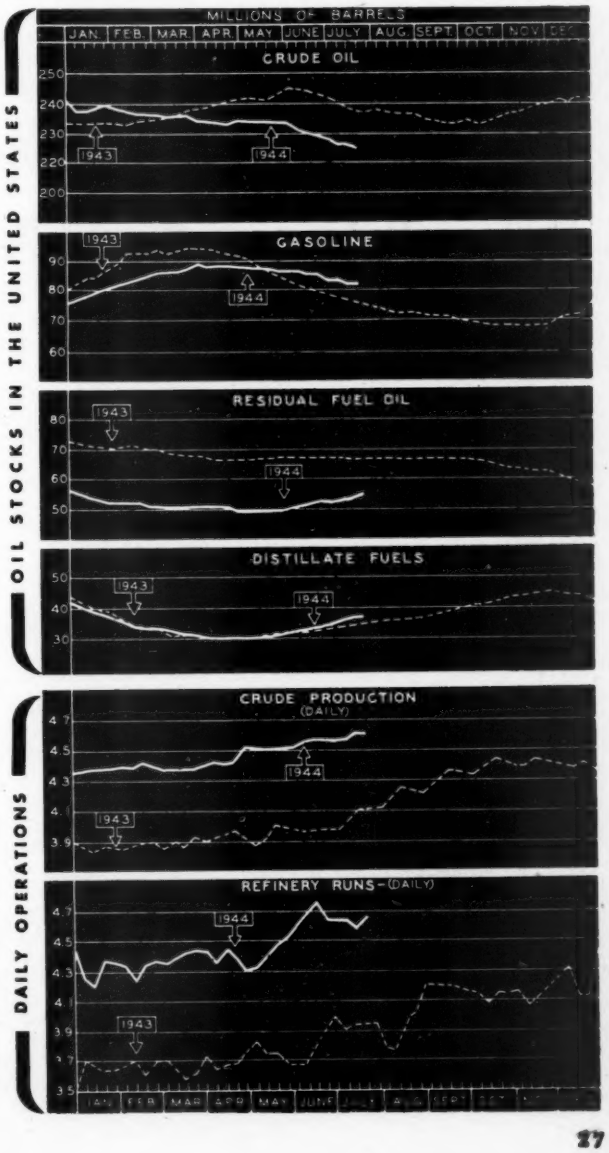
CRUDE-OIL PRODUCTION 4,617,450 bbl. daily average week ended July 29—down 4,950 bbl. Year ago 4,121,200 bbl.

REFINERY RUNS 4,684,000 bbl. daily week ended July 22—up 109,000 bbl. Year ago 3,954,000 bbl.

QUESTIONS having to do with the position of the independent refiner in the postwar period are asked frequently. It is assumed that these refiners as a group will continue to operate as they have been over the past 2½ years until the war ends and then will be confronted with problems of adjustment to peacetime operations common to the entire industry. In general, the war period has been profitable to those smaller refiners who in normal times have more lean than fat periods in their efforts to get adequate returns from plant operations.

IN the postwar period most of these refiners will be confronted immediately with the problem of adequate crude-oil supplies. This requirement since Pearl Harbor has been taken care of largely by allocation of crude-oil supplies through voluntary arrangements and through governmental directives. The full force of the changes that have taken place in crude-oil output, involving substantial reductions in some of the areas which fully supported independent refinery operations previous to the war, will become apparent. This is particularly true in the Mid-Continent and Middle West refining areas. The only answer to this problem, according to those who have made a study of conditions, is for refiners, acting collectively, to assure that they have outside crude oil, to supplement the dwindling supplies adjacent to their plants. It is explained in this connection that the war additions made to the major trunk-line systems should aid independent refiners in solving this basic problem. Several of the independent plants are now connected to major product pipe lines.

THESE refiners are also not as concerned as they were a year or two ago in regard to manufacturing trends. It was feared by many that the new war processes which have been developed largely at the major refineries would give the large operators a permanent advantage in manufacturing costs. Many now feel that the fact that they are not burdened with high investments in war-product operations may be helpful rather than the contrary. They are confident that the new processes can be adapted to the requirements of the smaller plants as soon as refinery engineering firms have time to give this problem special consideration.



Acme Newspictures.

American and British officials assembled for petroleum policy discussions which are continuing this week. Around the table are: Secretary Harold L. Ickes, petroleum administrator; Secretary Cordell Hull and Charles Rayner, petroleum adviser, Department of State; Harry C. Hawkins, director, Office of Economic Affairs, Department of State; Secretary of the Navy James V. Forrestal; Under Secretary of War Robert Patterson; Victor Butler, secretary of the British delegation; Sir William Brown, chief technical adviser to the British delegation; Rt. Hon. Richard Law, British minister of state; Rt. Hon. Lord Beaverbrook, lord privy seal, head of the British commission, and Rt. Hon. Ben Smith

Permanent Committee May Maintain Open-Door Policy in World-Petroleum Affairs

by Henry D. Ralph

WASHINGTON. — As the British-American cabinet level petroleum discussions neared a close this week it appeared probable that an agreement would be reached whereby the two nations would cooperate in maintaining an open door policy toward development and distribution of oil throughout the world.

Prospects are for a set of policies and for a permanent joint committee to implement them, and that other oil-producing nations would be invited to join in the declarations and to appoint representatives to the committee.

The principles probably will include a declaration that present concessions of nations of all countries are to be respected and that new concessions may be sought on an equal competitive basis but the economic welfare of producing nations must be considered in all development and exploitation.

Another principle will be that there is sufficient oil in the world for the use of all nations and that development of reserves should be orderly and in conformance with conservation principles, while distribution should assure ample supplies to all peace-loving nations and particularly to maritime nations without their own supplies.

Apparently the agreement will not include any marketing quotas or cartel features but on the contrary will declare against actions by any government restricting the free development of any oil resources or free marketing in any territory, although the question of local tariffs probably will not be covered. This principle, if carried into effect, would remove the restrictions which have hampered American companies in developing concessions in the Persian Gulf area, and it can be assumed that the U. S. Government will insist on such an interpretation and on its effective implementation.

Operating Program

The proposed joint committee would maintain a continuous study of world-oil conditions, gather statistics on production and demand, keep informed of the foreign activities of the oil companies of the participating nations, and otherwise seek to insure application of the agreed principles to world-oil trade and prevent friction among competing countries and nations.

The British-American discussions are expected to be concluded this week, and reports will be made to the British parliament and to the U. S. Congress. It is anticipated that the joint committee will be established at once, perhaps on an informal basis at the start, and that a call will be made for a world-oil conference to which all oil-producing nations will be invited.

Phillips Leases Colombian Tract

BARTLESVILLE, Okla. — Phillips Petroleum Co. confirmed the report that it has leased from Benedum-Trees interests and Leonard Oil Development Co. of Pittsburgh the Simiti land, comprising approximately 1,000,000 acres lying in the Magdalena River valley in Colombia. This land is about 250 miles upstream from Barranquilla, Colombia's principal port on the Carribean Sea. The tract lies approximately midway between the Barco concession in eastern Colombia and Las Infantas field in central Colombia which contains 1,200 oil wells and 49 dry holes and had produced 312,000,000 bbl. of oil through 1942. The 10-in. pipe line serving Las Infantas runs along the eastern edge of the Simiti lands and it is now carrying 57,000 bbl. daily.

DSC Promises to Make Subsidy Payments on OPA-Approved Oil

WASHINGTON. — Purchasers of crude oil produced by stripper wells may pay subsidy prices authorized by the Office of Price Administration in amendment No. 2 to revised maximum price regulation No. 436 pending Defense Supplies Corp.'s regulations which are being issued within a few days. DSC will reimburse such payments since the regulations will apply to all sales made on and after August 1, 1944.

Applicants for the subsidy fall into three classes.

1. The first purchaser of the crude oil produced in an eligible pool.

2. Producers of oil from eligible pools who refine or otherwise use the crude without selling it.

3. Exceptional cases where for convenience of administration it is deemed advisable by DSC to name as an eligible applicant a person other than the first purchaser.

Claims will be filed monthly and will require a separate listing of all purchases (or production as the case may be) from a particular pool. Claims for any given month must be filed before the end of the second succeeding calendar month.

Representatives of DSC, PAW, OPA and officials of industry associations and large crude purchasers have been meeting this week to work out provisions in the forthcoming regulations and forms for filing claims for reimbursement.

State Pool Boundaries to Prevail

WASHINGTON.—Amendments to the subsidy order, issued by the Office of Price Administration this week and effective August 1, make some changes in fields affected and clarify operating policies in determination of claimants and eligible pools.

The order provides for cooperation with Defense Supplies Corporation which will determine the proper claimant, most often the first purchaser, for the subsidy. Section 12 is rewritten to specify that increases be passed on to all persons purchasing prior to the claimant.

Provision is made for application on an annual basis in cases where the arbitrary December 31, 1943, date does not reflect a true picture of specific fields. In such cases, after application has been denied under the present basis, owners may make application to OPA giving total production for the year preceding date of application, and the number of operating wells on the last day of each month for the period. This applies both to fields omitted from the subsidy list and to fields inequitably priced.

The Smackover clause restoring base price to 98 cents in that Arkansas field, is also a part of the amendment.

Close cooperation between OPA and state conservation authorities is being effected with OPA accepting, subject to later revision if necessary, the state geographical designations of various wells and pools. No list of individual leases will be published by OPA. Individual operators in doubt of the subsidy status of particular leases should obtain information from state officials rather than from OPA.

Corrections Made in OPA List of Pools

WASHINGTON. — The Office of Price Administration this week corrected and brought up to date the list of fields coming under the stripper-well subsidy program.

New Fields Added

Indiana: Trenton (old), Jay, Blackford, Grant, Huntington, Wells, Adams, Wabash, Delaware, Madison, 35 cents.

Kansas: All pools, Montgomery and Lebette, 35 cents.

Texas: All pools in Callahan County, except Scranton, 35 cents.

Deleted Fields

Illinois: Aden, Wayne and Hamilton, 25 cents; Albion, North, Edwards, 35 cents; Maunie, North, White, 35 cents; Mount Erie, North, Wayne, 25 cents.

Kansas: Craber, McPherson, 25 cents.

Oklahoma: Osage, Jefferson, 25 cents.

Texas: Heyser, Calhoun and Victoria, 35 cents. All pools in Coleman County except add Anzac-Morris.

Price Corrections

Louisiana: Pleasant Hill, De Soto-Sabine, 35 cents, not 25.

Oklahoma: Watumka, South, Hughes, 35 cents, not 20.

Wyoming: Poison Spider, Natrona, 25 cents, not 35.

Corrections in Spelling

Indiana, Caborn, West, Posey, 35 cents, not Carbon.

Kansas: Callyer, Elk, West Half, 25 cents; Dory, Elk, West Half; Dunkelberger, Elk, West Half; Ferguson, East, Elk, West half; Ferguson, East, Elk, West Half; Moline (not Malins), Elk, West Half; Porter, Elk, West Half; Mills, Elk, West Half; Severy, Elk, West Half; Walker, Elk, West Half; Webb, Elk, West Half. All Elk County fields should carry designation "West Half," otherwise, correct. Zurich, Rooks, 20, not Kurich, Rocks; Smock-Slass, Butler, not Smock-Deiss; Trees, Cowley, not Tries.

Kentucky: Hebbardsville, Henderson, not Helbardsville.

Michigan: Grant, Gladwin, not Grout; Pine River, Gratiot, not Gladwin.

Montana: Reagan Nose, Glacier, not Reagon.

Oklahoma: Milroy, Stephens, not Milrey..

Texas: All pools in Clay County, New York City Mississippi Lime, not Strawn. All pools in Stephens County, not Stevens. Bateman Ranch, King County, insert "ranch". Noack, Williamson, not Noach. Tuleta, Bee, not Queleta. Spindletop, Jefferson, not Spindleton. Jack County, Bryson pool, not Greyson.

The Smackover field, Arkansas, previously cut to 83 cents a barrel and given a premium payment of 20 cents, has been increased in base price to 98 cents (the figure prior to the amendment.) This is in line with an OPA policy to add subsidy payments to the field price established prior to the subsidy program.

California Operators Petition for Subsidy

LOS ANGELES.—The California Stripper Well Association has petitioned the Office of Price Administration to certify certain California fields as qualifying in the subsidy program. This will relieve small operators from hiring petroleum engineers and accountants to prove a condition that is evident from production data available in the District 5 office, Petroleum Administration for War and the state Department of Natural Resources.

The fields covered by the stripper association petition are broken down into two classifications, one where definite production data are available and the other where production has been estimated because the areas are not segregated. Fields asserted to have averaged less than 9 bbl. per well in 1943 are:

San Joaquin Valley. — North Belridge (shallow), South Belridge (Middle Belridge area) (shallow), East Coalinga (main area) (Cretaceous), Kern River (all pools), Temblor Ranch, Sunset, West Mount Poso, McVan, Wasco (shale), Wheeler Ridge (all pools), Chico Martinez, Devil's Den, Pyramid Hills.

Coastal.—Capitan (Sespe), Santa Barbara (Vaqueros), Summerland (all pools), Bardsdale (other areas), Sespe Canyon, Shiells Canyon, Newhall, Wiley-Towsley Canyon, Modelo, Tapo-Eureka, Torrey Canyon, Ex-Mission, Sisar-Silverthread, Timber Canyon, Simi, Lion Mountain, Edna, Los Gatos, Sargent.

Los Angeles Basin.—Torrance-Hermosa (Torrance area) (Flint), Whittier (Bartola area), Whittier (Central area), Buena Park, Los Angeles, Puente Hills.

Pools with average per well production estimated at less than 9 bbl. daily from June 30, 1943, to June 30, 1944, are:

San Joaquin Valley. — West Coalinga (main), Lost Hills (main), McKittrick Front (upper), Dominion.

Los Angeles Basin. — Rosecrans-Athens (Athens) (upper), Torrance-Hermosa (Torrance area) (main), Torrance-Hermosa (Torrance area) (thirty-four), Whittier (Rideout-Heights area), Kraemer, Lawndale, Newport.

FEA Confirms Oil Shortage in Reich

WASHINGTON.—Germany is now facing her most critical oil shortage, and consumption has been reduced so drastically that even essential war industries are suffering, the Foreign Economic Administration reports.

Until April of this year, Allied bombing did not cause damage to Germany's oil refineries sufficient to hamper operations or even require heavy drain on reserve stocks, but FEA economic warfare analysts declare that during the past 4 months air attacks have so increased in size and accuracy that total production of all liquid fuels and lubricants, including such gasoline substitutes as alcohol, has been reduced to much less than half the April level.

Production at German synthetic gasoline plants is now less than 60 per cent of the April rate, and natural crude oil refineries are down to about 40 per cent of April capacity. In spite of drawing on reserve stocks heavily, FEA declares oil supplies are falling far short of meeting minimum essential needs even after drastic curtailment of important war uses.

Nazi and Jap Oil Resources Blasted by Allied Bombers

Dwindling oil resources of the Axis suffered further pounding in the past week, when the rich Ploesti oil fields in Romania and synthetic fuel plants at Merseburg, in the heart of the Reich, and Netherlands East Indies installations were blasted by Allied bombers. In a coordinated raid from Italy, more than 500 Liberators with probably an equal escort bombed the Ploesti oil center for the twelfth time. Ploesti had been bombed by RAF air forces a few hours earlier.

Around 1,000 Flying Fortresses with an equal number of fighters bombed the Luena synthetic oil plants at Merseburg, for the third time this month, and other central German targets.

The Allies are maintaining a steady air offensive against Japanese-held oil fields and installations on Netherlands New Guinea. The most recent target of American planes was the Vogelkop oil field near Sorong, in the westernmost section of the island.

Northeast of Sorong, at Manokwari, a refining center for nearby oil fields, Allied planes dropped 36 tons of bombs on installations and airfields. Further south, shore installations on McCluer Gulf on which another refining town, Babo, is located were also bombed by Allied planes. The fighting now in progress opposite Wakde Island, in the Sarmi area of Netherlands New Guinea, can be linked to the battle for strategic ports and oil fields, for near here are the remaining developed petroleum sources of the huge island.

On July 30 oil fields of Yugoslavia were strafed by 500 Mediterranean-based heavyweights.

Federal Regulation Scored by Gas Group

THE regulation of the production, gathering and conservation of natural gas is a function of the respective producing states and not a federal agency, according to a resolution adopted by the directors of the Independent Natural Gas Association of America in session August 1 at Tulsa. The adoption of the resolution followed a discussion of recent federal regulations which it is felt are inimical to the best interests of the natural gas industry and its customers.

A companion resolution adopted by the directors at the meeting "favors the extension of natural-gas pipe-line facilities which will afford adequate markets for producers and meet the expanding demands of consumers and the association is opposed to any limitation on the industrial use of natural gas." The association directors agreed on an aggressive campaign in support of the two resolutions.

E. Buddrus, president of the new association and head of the Panhandle Eastern Pipe Line Co., presided at the meeting. It was announced that Mid-Continent offices of the association have been opened in the First National Bank Bldg., Oklahoma City with Charles L. Orr in charge.

Two Standard Oil Units To Be Consolidated

NEW YORK.—Standard Oil Co. of New Jersey, operating subsidiary of Standard Oil Co. (New Jersey), announced last week that at the end of the year consolidation with Standard Oil Co. of Louisiana, its wholly owned subsidiary, would be effected. The name Standard Oil Co. of New Jersey is expected to be retained. The announcement said M. J. Rathbone, president of the New Jersey company, would be president of the merged companies. M. W. Boyer, executive vice president of the Louisiana company, will be a vice president and will continue to have his offices in Baton Rouge.

Elk Hills Crude Put Up for Bids

WASHINGTON.—The first crude oil obtained from Elk Hills under Joint Resolution of Congress 344 authorizing increased production in Naval Reserve 1 will be offered for public sale August 15. Approximately 2,500,000 bbl. of crude is involved, representing estimated production in the reserve for the 6-month period ending December 31, 1944.

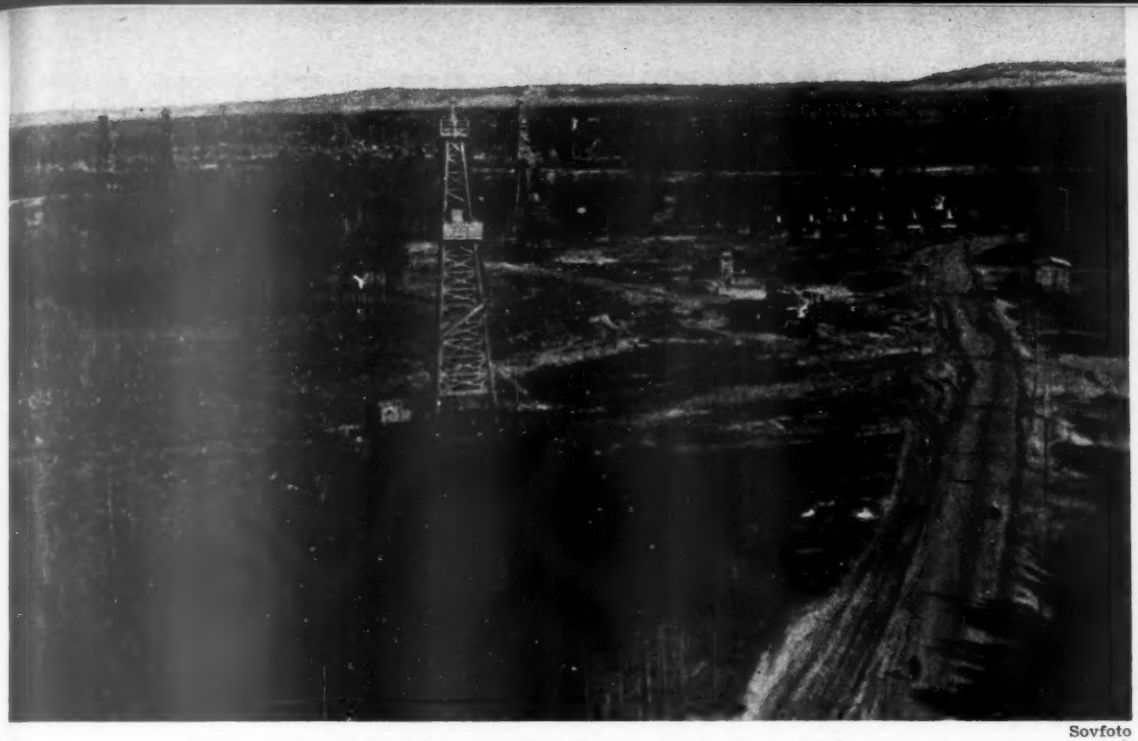
The public sale will take place at 10 a.m., P.W.T., in the Federal Office Building, San Francisco. Successful bidders will make available to the armed services various types of refined military fuels, especially 100-octane, Grade 130 aviation gasoline for Army and Navy air forces, Navy fuel oil, special grade for the fleet, and 80-octane all-purpose motor gasoline for the ground services, all grades urgently needed for the war in the Pacific.

Each bidder will be required to submit in advance of the public sale an accompanying statement setting forth the refining and other facilities owned, controlled or available for use in delivering the military products manufactured from Elk Hills crude, plus availability of experienced operating personnel, and ability of the refiner to utilize fully his facilities and personnel. The oil will be sold to the highest qualified bidders. All bids and accompanying statements must be submitted in triplicate.

Bidders will be urged to have representatives present at the sale, to raise or otherwise increase the value of bids after hearing them read aloud. After the sale, bids will be taken under advisement by the Navy and acceptance made within 30 days, subject to later approval of the president which may not be obtained within the 30-day period. Place of delivery of the crude oil will be at U. S. Naval fuel annex, Elk Hills.

Court Finds Companies Did Not Violate Antitrust Law

MINNEAPOLIS. — Repercussions of the Madison oil trial 8 years ago were heard in federal court here last week, when Judge Cunnar H. Nordbye found for the defendants in an action brought by two jobbers, Clark Oil Co. and Plymouth Oil Co., of Manitowoc, Wis., against Phillips Petroleum Co., Pure Oil Co., Standard Oil Co. of Indiana, Sinclair Refining Co., Shell Oil Co., Inc., Socony-Vacuum Oil Co., Skelly Oil Co., Continental Oil Co., and Cities Service Oil Co.



Sovfoto

One of the new Soviet fields in the Ural Mountains developed since start of the war

THIS WEEK

DRILLING—Completions rise slightly, totaled 459 last week. . . . Failures fall under 30 per cent, oil wells rise to 59 per cent of all completions. . . . Wildcat completions slump to 90 for the week, including only 13 oil, condensate and gas discoveries. . . . ¶Drilling rate must rise to 600 or 650 completions per week, if last-half-year objectives are reached. . . . ¶Texas accounting for nearly 30 per cent of completions. . . .

TRANSPORTATION—ODT transfers 2,000 asphalt tank cars to crude-oil service, probably divided between eastern and Pacific Coast runs. . . . ¶Shortage of ocean barges puts snarl in East Coast distribution which may become critical this winter. . . . ¶Oklahoma Pipe Line Co. expanding and building new outlet for Cranfield and Heidelberg pools in Mississippi. . . . ¶Tennessee Gas & Transmission Co.'s 24-in. gas line half completed. . . . ¶Big-inch line ran 319,203 bbl. daily, week ended July 22—highest throughput since week ended June 10. . . .

PRODUCTION—National output of all liquids estimated at 4,906,550 bbl. daily last week. . . . August quota calls for 4,945.400 daily, including 289,100 daily of natural gasoline and condensate. . . . ¶Texas' output static at 2,067,300 bbl. daily but will rise because of higher allowables this month. . . . ¶California yield of all liquids about 12,000 bbl. daily under PAW quota, calling for increased over-land shipments from Southwest.

REFINING—Another fluid-catalyst-cracking plant goes on stream at Point Breeze, near Philadelphia and still another is nearly completed at Atlantic Refining Co.'s Port Arthur, Tex., refinery. . . . ¶PAW promotes two men in foreign refining division, indicating greater activity anticipated in that field. . . . ¶Foreign Economic Administration reports Germany's synthetic-fuel productive capacity reduced 40 per cent since April, and crude-oil refineries have been cut 60 per cent, by Allied bombing. . . .

PRICES—Producers reviving fight for general price increase. . . . Inequities showing up more frequently as details of subsidy plan are examined. . . . Conviction growing that subsidy offers inadequate incentive for expansion of drilling and producing operations. . . . Time element in returns and uncertainty of subsidy continuation virtually excludes secondary-recovery projects. . . .

EQUIPMENT—Hopes for truck tires to facilitate oil operations dealt critical blow by WPB decision to cut war-industry quotas. . . . ¶Delays of 1 to 3 weeks now common in moving rigs from location to location, defeating military and industry desire for more production. . . . ¶Distress condition to last for at least 2 months, possibly longer, depending on war developments. . . . ¶Concentration on bomber production eats deeply into supply of heavy-duty tires, and the manpower for producing them. . . .

FOREIGN—Oil men chafing at State Department secrecy concerning British and American oil-policy discussions. . . . ¶Government takes attitude that conversations relate to foreign policy, that operations must then be fitted to decisions. . . .

California Drilling Campaign Will Continue Vigorous in Postwar Era

by L. P. Stockman

THE California oil industry has started giving serious thought to postwar plans even though hostilities in the Pacific will require maintenance of current high production and maximum operation for the duration. Because the petroleum industry has spent approximately 1 billion dollars for wartime construction and expansion of plants to accelerate production, refining, and transportation operations, the conversion problem will not be as complex as that faced by many other industries.

The military demand for aviation gasoline, special lubricants, fuel oil, diesel and other refined products will reach a higher level when all-out war gets under way in the Far East. It is likely, therefore, that civilian allotments will not be increased on the West Coast until conclusion of the Japanese war. It is generally conceded that with the European war over, it will be possible and advantageous to divert additional amounts of refined oil to the South Pacific from the Gulf Coast, South America and the Mediterranean to augment shipments from California.

Many Factors Unpredictable

Many crosscurrents and unpredictable factors will influence postwar conditions and for this reason there is no unanimity of opinion as to how best the problem should be met. The changeover from a wartime economy will be gradual and permit ample time to meet changing conditions as they develop, many oil men contend. Others, however, visualize a highly competitive condition upon conclusion of the Japanese war due to expanded refining facilities and a temporary disruption of outlets. The latter belief appears to be the most logical as the demand for refined products early in the postwar period should be lower than normally.

Before the war, California's normal market included Australia, New Zealand, China, Alaska, the Hawaiian and the Philippine Islands, the Pacific Coast states and last but most important, Japan. Early in the postwar period, Japan's petroleum requirements will be only a small part of its prewar consumption.

Crude oil in California is tight. For the first time in several years refiners are making crude-oil-purchase commitments extending over a period of several years as the first move to meet postwar conditions. It is quite likely that new uses will be developed for petroleum as a result of intensive chemical research. Standard Oil Co. of California already has begun studies in the production of plastics and this may be only one of the many new outlets.

Production at the close of 1944 should be around 900,000 bbl. per day, substantially above current levels owing to increased development work at Elk Hills, Santa Maria Valley, Paloma and other fields. But the Navy Department is expected to close Elk Hills upon the conclusion of the Jap war or shortly thereafter. This will reduce state production about 65,000 bbl. per day to which also must be added the normal decline in other fields. This means that California production at the end of the Japanese war, possibly late in 1945 or early in 1946 may be approximately 700,000 bbl. daily. By the end of the war, crude and refined-oil stocks in California will be down to rock bottom. This means there will be approximately 125,000,000 bbl. of empty storage which can be used as a stabilizing factor for several years provided refined-oil prices are high enough to permit the accumulation of stocks.

Development work in California must be continued at an aggressive rate for the next several years in order to offset the normal decline in existing fields and to cushion the abrupt shutdown of Elk Hills. Unless major discoveries are made, the West Coast will not have excess production within the next decade. Secondary recovery and new efficient production methods will be applied but developments of this type require several years to reach maximum efficiency and this type of work can only be done under the stimulus of higher prices.

Drilling operations are in excess of development work prior to the Jap war and will probably continue at a high rate for several years. Approximately 2,000 new wells will be completed in 1944, more than twice the number drilled in the several years preceding start of hostilities.

Faced with a slowly declining production and higher producing costs, together with the possibility of restricted markets, it appears that the California oil industry will enter a highly competitive phase upon conclusion of the war when existing controls are released.

Present plans contemplate the immediate shipment of approximately 25,000 bbl. of crude oil per day by rail from Texas to California and this will be stepped up to 40,000 bbl. daily if railroads can handle the necessary number of tank cars. The Navy has been shipping its diesel requirements westward for about a year and this will be continued because California marketers do not produce a grade meeting specifications. Some gasoline has been moved into Pacific Coast territory but not in the quantity now considered.

California is not directly affected by the European war, as far as production and consumption of petroleum is concerned, and will probably not be affected to any great extent upon the cessation of hostilities in that theater. Its war market is westward and will continue there until fighting ends in the Far East and South Pacific. Diversion of refined oil from other areas to Pacific operations will be necessary and should alleviate conditions.

Motor-Fuel Demand 17 Per Cent Greater

WASHINGTON.—Demand for motor fuel in the third quarter is expected to be 17 per cent greater than for the same 3 months last year, it was reported this week by the Bureau of Mines. Demand for August, the bureau reported, is estimated at 68,200,000 bbl., or 17.6 per cent above the actual a year ago.

The daily average supply of domestic crude oil to meet the market demand in August is 4,716,000 bbl., according to the bureau's calculation, an increase of 390,100 bbl., or 9 per cent, compared to August 1943.

A substantial increase in crude-oil runs to stills is indicated during the third quarter with a further moderate gain in production. The available supply of crude is being augmented by increasing imports and by heavy withdrawals from stocks, the bureau pointed out in accounting for the moderate anticipations in production operations compared to the much higher expectation in refinery throughput.

The total demand for motor fuel may approximate 187,000,000 bbl. for the second quarter of 1944, a gain of about 25,000,000 bbl., or 16 per cent, according to preliminary figures.

Finished and unfinished gasoline

inventories amounted to 86,712,000 bbl. on May 31, 1944, or about 2,825,000 bbl. more than on May 31, 1943. Considering the much larger gains in refinery production and demand for gasoline, these stocks are relatively lower than last year. Current statistics indicate a decline of about 2,900,000 bbl. in these stocks during June.

Direct sales of natural gasoline and imports are estimated at 2,500,000 bbl., making an indicated refinery production of 62,000,000 bbl.

Benzol and natural gasoline to be blended at refineries are estimated at 5,620,000 bbl. The application of the yield, estimated at 39.1 per cent, to the straightrun and cracked gasoline production of 56,380,000 bbl. gives total crude runs of 144,200,000 bbl., or 4,651,600 daily.

Crude oil for export and to be used as fuel and losses is estimated at 6,300,000 bbl.

The estimated demand for domestic crude oil is 146,200,000 bbl., or 4,716,100 daily. On the basis of present rates of production, a substantial reduction in crude stocks will be necessary to meet this demand.

SUMMARY OF FORECAST FOR AUGUST 1944

(Thousands of barrels)

	Forecast 1944	Actual 1943
Demand for motor fuel*	68,200	57,996
Supply of motor fuel:		
Straightrun and cracked gasoline	56,380	47,318
Natural at refineries	5,620	5,493
Total refinery production	62,000	52,811
Other natural and imports	2,500	3,058
Decr. in finished stocks	3,700	2,127
Available supply	68,200	57,996
Crude-oil requirements:		
Per cent yield of gaso.	39.10	37.29
Refinery crude required	144,200	126,908
Daily average	4,652	4,094
Domestic crude runs	139,900	125,874
Exports and losses	6,300	8,231
Total demand, domestic crude	146,200	134,105
Daily average	4,716	4,326
Decr. in domestic stocks		3,472
Actual production		130,633
Daily average		4,214

*Motor fuel as used in this report includes gasoline and naphtha used for all purposes, but does not include heavier distillates used in the operation of tractors or burned in diesel engines.

Tank Cars Diverted From Asphalt Service

WASHINGTON. — Immediate diversion of 2,000 tank cars from civilian asphalt service to movement of crude oil to midwestern and East Coast refineries from Gulf Coast fields is asked by Deputy Petroleum Administrator Ralph K. Davies in response to soaring war demands for petroleum products. Davies acted in cooperation with Office of Defense Transportation, which ordered the cars shifted to Petroleum Administration for War certified essential service, and Public Roads Administration, which advised state road organizations of the reduction in asphalt deliveries.

State road bodies were requested to determine which roads were most in need of repairs and which could be temporarily delayed. Arrangements were to be made with asphalt distributors to concentrate their shipments of paving asphalt to those points where road repairing work must continue.

"Sudden shifting of asphalt tank cars to military service is only one of a series of similar measures taken during the last several weeks to meet the sudden spurt in military requirements for petroleum products," Davies said. He emphasized that stocks of civilian petroleum products will be tight not only throughout the eastern seaboard but, if requirements do not level off, will spread into other sections of the country.

PAW Foreign Refining Staff Is Expanded

WASHINGTON.—Appointment of M. J. Gavin and J. G. Detwiler as assistant directors of the Foreign Refining Division, Petroleum Administration for War, was announced last week by Deputy Administrator Ralph K. Davies.

Gavin's duties will relate to the facilities side of the division while Detwiler's primary responsibilities will relate to the operations of foreign refineries.

A veteran of 29 years in the petroleum industry, Gavin joined PAW as a foreign petroleum specialist in October 1942. He started his petroleum career as an assistant chemist for the Union Oil Co. of California in August 1915. In 1918, Gavin was employed by the Bureau of Mines, where he remained until 1929 when he joined the staff of the Foster Wheeler Corp. in Los Angeles. He served with that corporation as district manager until 1942.

Detwiler joined The Texas Co. as a works chemist at Port Arthur, Tex., in 1911. In February 1944, he took leave from his position as supervisor of tests and specifications, refining division, Texas Co., New York City, to join the PAW Foreign Refining Division as a petroleum technologist.

Gavin will be assisted in his work by L. M. Miller, chief of the facilities section, and O. G. Pratt, chief of the Russian section. C. Marvin Case, chief of the operation section, and D. S. Fraser, chief of the technical section, will assist Detwiler.

A.P.I. Postpones Annual Meeting

NEW YORK.—The American Petroleum Institute last week deferred indefinitely the twenty-fifth annual meeting scheduled to be held in Chicago, November 13-16.

President W. R. Boyd, Jr.'s recommendation and executive committee approval was prompted by the urgent request of J. M. Johnson, director of the Office of Defense Transportation, that all conventions planned during the remaining months of 1944 be cancelled in the interest of wartime transportation.

"Cancellation of our scheduled November meeting," said President Boyd, "will relieve the railroads from all the problems involved in transporting to and from Chicago the several thousand oil men who customarily attend the institute's annual meeting, and this is but another demonstration of the manner in which the petroleum industry gives all-out cooperation to the government in the conduct of the nation's war program.

"The time for holding the institute's meeting will be determined later with appropriate recognition of then existing wartime conditions and necessities," said Boyd.

Cancellation of Oil Meetings Lauded by ODT

WASHINGTON.—Col. J. M. Johnson, director of the Office of Defense Transportation last week acclaimed the widespread consideration of the petroleum industry to cancel or postpone industry conventions and major meetings in deference to troop-laden railroad trains and delivery of war products as "a tangible contribution to the war effort."

In formal acknowledgment of the oil convention-canceling proposal as projected by the Petroleum Industry War Council, the ODT director assured William R. Boyd, Jr., PIWC chairman, that the plan of the petroleum industry's national war agency "will serve as an example to all other convention-planning groups."

Chairman Boyd announced that 108 oil industry trade associations of national and state-wide scope have been asked to accord serious and sympathetic consideration to the appeal of the ODT that all conventions planned during the remaining months of 1944 be cancelled in the interest of wartime transportation. Two weeks ago, the Independent Petroleum Association of America cancelled its annual meeting scheduled for Dallas in October.

Vital Compressing Station Restored With Little Lost Time

CLARKSBURG, W. Va.—Full restoration of the Hope Natural Gas Co.'s Bridgeport compressing station, about 10 miles northeast of Clarksburg, was completed last week. The station was severely damaged and some parts were completely destroyed June 23 by the cyclone which killed 100 people and demolished much property in a sweep across northern West Virginia.

Although more than a month was required to complete the restoration project, two 500-hp. compressing units, all auxiliary equipment and a new water system were placed in operation June 29, only 5 days and 17 hours after the cyclone struck. The third 500-hp. unit was started July 3 and the fourth compressor, a 750-hp. twin-engine installation, was placed in operation July 8.

Repairing and completion of the new dehydration plant was completed July 24, a complete new water-cooling system went into action July 27. Construction of a new steel compressor building, 64 by 90 ft., remains to be completed around the temporary canopy now sheltering the main units. This phase of restoration can be accomplished without interfering with operation of the station at precyclone efficiency.

L. L. Tonkin, president of Hope Natural, this week paid high tribute to two employes on duty when the cyclone hit for preventing more serious damage although both were injured when the station was struck. He also praised efficiency of the crews assembled from other parts of the company's system in returning the station to operation with minimum loss of time.

Hope's Key Station

The Bridgeport station, midway between Bridgeport and Boothsville, is one of the most important on the company system. Without benefit of compression capacity at Bridgeport, many of the war industries in the eastern states would have been forced to operate on reduced volumes of natural-gas fuel.

The station, Tonkin explained, has been modernized and enlarged for the purpose of operating one of the company's underground natural-gas storage projects. This implies, of course, that the shortage caused by interrupted operation of the compressor station may have been unnoticed by consumers until next winter when gas stored during the summer months is withdrawn to meet seasonal requirements.

Two corrugated iron buildings, housing the four compressing units of 2,250 hp. and auxiliary equipment, two dwellings, cooling towers, water tanks and other facilities comprised the station. A new dehydration plant, capable of handling 75,000,000 cu. ft. of gas daily, was practically completed and ready for operation.

When the storm hit the station area, the four compressing units were in operation, working on gage pressures of 60-lb. suction and 290-lb. discharge.

Dean Zarbaugh, engineer, and Dewey McEldowney, oiler, barely had time to pull the ignition switches and shut down the four engines before the station building started to disintegrate. The men sought protection under the engines amidst falling structural-steel roof trusses, traveling cranes, chains and other heavy equipment. After the storm passed, Zarbaugh and McEldowney closed the main gas valves to prevent explosion, fire and further damage which might result from escaping gas. All buildings at the station site, including dwellings, were leveled. Mrs. Zarbaugh and the couple's baby were found in an adjacent field. The baby was fatally injured but Mrs. Zarbaugh is recovering.

Inspection after the cyclone disclosed that all buildings and the water tower were completely demolished. The service tank containing 5,000 gal. of water had crashed from an elevation of 40 ft. on the exposed tube gas coolers. The 50-ft. vertical dehydration still lay on its side with half of the concrete base torn from the ground. A twisted mass of steel wreckage enveloped the main engines and gas compressors. The electric generators and some motors were soaked with acid from storage batteries and every piece of equipment was damaged to some extent, plastered with mud and soaked with water.

Emergency crews started clearing wreckage the following day. A temporary wooden canopy, 61 by 87 ft., was raised over the main compressing units. A new auxiliary building was started and a new water tank was erected on a nearby hillside. Connecting lines were laid to the water tank and a temporary water-spray line was installed on the banks of the creek for cooling purposes. Damaged tubes in the gas coolers were replaced and the side frames straightened or replaced. Work was concentrated on the most vital portions of the plant in order to reestablish as many of the facilities as possible within the shortest time. The fact that many units were idle only a few days and that all facilities were operating at normal efficiency within little more than a month attests to accomplishment of objectives.

Rise of 13 Cents Posted for Keystone Ellenburger Pool

DALLAS. — Office of Price Administration has approved an increase of 13 cents a barrel for Ordovician crude oil in the Keystone Ellenburger pool of Winkler County, on application of Gulf Refining Co. Gulf posted a schedule of $1.25 a barrel for oil from the pool of 40-gravity or higher effective August 1. This meets the posting for crude of corresponding gravity in the Mid-Continent area. The former posting was $1.12.

The new price starts at 95 cents for 25-gravity and below, with a 2-cent differential for each degree of gravity. The OPA approved the Gulf application as a tentative maximum price for the area.

Gulf gathers the oil in the area and delivers it to Magnolia Pipe Line Co., which has been transporting the crude by tank car from Midland to the Paulsboro, N. J., refinery of Socony-Vacuum Oil Co., its parent company.

Barnsdall and Sohio Buy Fain Drilling Co.

Barnsdall Oil Co. and Sohio Petroleum Co. have purchased the name and assets of Fain Drilling Co. for a sum reported to be about $500,000. The assets acquired consist principally of 10 rotary drilling rigs and complete accessories, automobiles and trucks. Barnsdall will operate the equipment, and, according to D. R. Snow, executive vice president of Barnsdall, a drilling department will be created with George Noland as manager.

Carter Buys Kerlyn Block

Carter Oil Co., Tulsa, is reported to have concluded a transaction by which it acquires Kerlyn Oil Co.'s 50 per cent interest in around 15,000 acres of undeveloped leases along a trend of the West Edmond field of Oklahoma, Canadian, Logan and Kingfisher counties, in Oklahoma. The deal involves an investment of approximately $3,000,000.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

In Lieu of Annual Meetings

THE decision of the American Petroleum Institute, Independent Petroleum Association of America, the Texas Mid-Continent Oil and Gas Association and other organizations to postpone or cancel their annual meetings is another all-out war contribution of the oil industry.

If the action becomes general among industrial and professional organizations, the railroads will gain important relief in the still greater transportation tasks ahead. The movement of troops will be expedited, including the rapid transportation of wounded from the fronts to hospital centers in this country. The decision of the associations' leaders is supported by every war consideration and will be approved by the entire industry.

But all organized groups will be derelict in their duties to members and to the entire nation if the calling off of these annual gatherings means a moratorium in the collective consideration of petroleum problems. Never was there a more pressing need for the industry's managements, operators and technicians to discuss fully and take action on perplexing questions already here and those in the making.

The maximum productivity of domestic oil fields to which many of the industry's leaders pointed a year or two ago is here. Increases in some fields will be largely offset with declines in others which cannot maintain early 1944 output. Some fields have been meeting allocations at the sacrifice of conservation practices.

Producers who have seen this situation in the making since the war regulations first became effective have plans to expand drilling over the remainder of the year to the extent that materials, manpower, and returns will permit. But the successful completion of 1,200 to 1,300 oil wells monthly in proven pools, is not going to support domestic and export demands for petroleum liquids which now exceed 5,000,000 bbl. daily.

As to exploratory tests, no one can project the success or failure of a wildcat program which in coming months will be one of the most extensive in petroleum history. Operators merit every praise in this effort to find new oil, despite the unsatisfactory operating conditions.

It is necessary to keep in mind, however, that it takes 1 to 3 years to get substantial production from successful wildcatting operations. Today's exploration will have little significance in supplying emergency needs unless the war extends over a much longer period than is now expected.

In refining and natural-gasoline manufacture conditions largely parallel those in production. Present operations based on facilities to manufacture required products are near capacity. Outside relief is restricted by transportation and the quality of crude oil and products available.

These and many other allied problems require immediate attention. Much can be accomplished by local discussions requiring little transportation. Through the larger organizations the findings of these smaller groups can be pooled and acted upon nationally.

The industry's technicians do not require large meetings to get results. Much can be accomplished through correspondence. Final decisions can be made known at Washington through a few chosen representatives. The main objective is to assure that the grass roots of the oil industry, whence comes its strength, do not become inarticulate and ineffective during a most critical period.

Senate Committee Finds Industry Doing Good Job

Harris & Ewing Photo

Sen. F. T. Maloney, Connecticut, chairman of the Senate committee which last week lauded the petroleum industry for its success in supplying military and essential civilian needs

WASHINGTON.—Military requirements make it impossible to increase the quantity of petroleum products available for civilians at this time, but any decrease in military demand should be used to offset the most serious civilian shortages, it is declared in the annual report of the Senate committee on gasoline and fuel-oil shortages. The committee, headed by Sen. Francis Maloney, of Connecticut, has been studying oil shortages for 3 years. Its latest report includes the following conclusions regarding petroleum:

1. This nation has been successful in accomplishing the tremendously difficult task of oiling a petroleum war on a global basis and at the same time maintaining our own petroleum economy, without which we could not have made our war production record.

2. Military requirements, exceeding the most extravagant guesses of informed persons as few as 3 years ago, are being met. These military requirements are constantly increasing with the scope and the success of our military and naval activities.

3. Transportation has been provided, supply balanced, and essential civilian needs met. There has been generally equitable distribution achieved for the supply of the civilian population.

4. We are now utilizing nearly all the oil which can be taken from the ground. This simply is not enough to put the civilian supply on a peacetime or near peacetime basis for nonessential uses. There is little likelihood of any increase in civilian supply until military requirements decrease. These, of course, must be met. Even giving full weight to the fact that private automobile transportation is vital to a great portion of our people, we are better off, by far, than any other nation engaged in this war.

5. Any decrease in military requirements will make available more of the total supply of petroleum for civilians. Civilians, therefore, should feel the benefit of military success, but must expect the drain on petroleum supplies necessary to these victories. The end of the European war should result in some easing of the domestic petroleum shortage.

6. The Pacific Coast may well become a critical area, should the crescendo of battle in the Pacific rise, while the war in Europe is still at its peak. Strenuous efforts are being made to provide additional transportation to and storage along the West Coast. In addition, steps which have been taken to enable the Elk Hills oil field to make its proper contribution for this war, should be vigorously pushed.

7. The black market in gasoline coupons is cutting heavily into civilian supplies. Efforts to stamp it out have not yet proved successful. Such efforts should be redoubled. The black market must be stamped out.

Pipe-Line Record

"The total mileage of new pipeline construction, pipe-line reversals and conversions up to July 1 of this year amounted to 11,563. The projects remaining to be completed will add another 717 miles.

"In the past 2 years we have successfully rebuilt our tanker fleet. This fleet is now serving the armed forces and making possible the use of the great quantities of petroleum which are being produced. It may well be, when the history of this war is finally written, that petroleum will prove to have been one of the most vital factors. We have been able to fuel almost continuous operations by thousands of planes over Europe. We are now able to fuel the new B-29 bombers, whose range is global. Germany, in recent months, has shown less and less ability to fuel its war machine. Recent reports indicate that the Germans are increasingly dependent on animals for transportation; that they are unable to put planes in the sky. We know that our bombers, flying with our petroleum, have severely impaired Germany's ability to produce and refine petroleum or synthetic petroleum products.

"The domestic petroleum transportation situation has been tremendously improved. Deliveries of petroleum and petroleum products to the eastern seaboard by all means of transportation are being made today at a rate in excess of 1,735,000 bbl. daily, compared with 1,369,000 bbl. daily in May 1943.

"The supply of tank cars, not only for rail movements to the East Coast and West Coast but for the myriad of diversified movements throughout the country, is particularly tight.

"The railroads are now transporting to the East Coast more than 700,000 bbl. daily. In July of last year this movement reached an all-time record of over a million barrels per day, but at that time approximately 45 per cent of the total movement consisted of crude oil, more than one-half of which moved on the short haul from Norris City, Ill., pending the completion of the second section of the 24-in. war emergency pipe line to the New York-Philadelphia area. Moreover, some 74,000 cars had been made available for service to the East Coast and approximately 80 per cent of those cars were moved in solid trainloads over symbol routes. Today, due to the near completion of the wartime pipe-line program, less than 30 per cent of the tank cars in East Coast service are carrying crude oil and nearly all of these are engaged in the long haul from the Southwest. The remaining 70 per cent are moving petroleum products, in many instances from widely scattered points of origin to less concentrated destination points in order to serve the needs of the armed forces. Because of the changing requirements for operating locations of tank cars, the number of cars in East Coast service has been gradually reduced until it has now reached approximately 60,000 cars, as a result of withdrawal of cars for other needed services. Rail movements of oil to the West Coast, which require a substantially higher turn-around time as compared to the East Coast, have more than doubled during the past year and every indication points to a greater increase in the months to come.

"There appears to be some shortage of oceangoing barges along the eastern seaboard, and this may re-

sult in inability to distribute stocks quickly. This shortage should be relieved.

"Probably the prime transportation problem within the United States in the coming year will involve the Pacific Coast, and steps are now being taken to make sure that sufficient oil will be transported to that area to supply not only increasing war needs in the Pacific theater, but also civilian requirements.

"Considerable savings will be achieved in transportation to the West Coast by utilizing the production of the Elk Hills field. This field will produce up to 65,000 bbl. daily when the present intensive drilling program has been completed.

"After supplying vast military demands we are still able to supply 87.5 per cent of the over-all prewar demand of our civilian and industrial economy. On the other hand, there has been a substantial increase in the use of all petroleum products for essential operations. As a result there has had to be a greater reduction in the consumption of gasoline by passenger cars and in civilian use of distillate and residual oils. Inventories of civilian grade motor gasoline this spring were still almost 30,000,000 bbl. below the level at the end of 1941.

"Very recent increased military requirements, in particular a demand for larger quantities of 100-octane gasoline, have removed all hope of an increase in civilian allotments until the military requirements decrease. A change in the military picture can result in an entirely different petroleum situation in this country. The military figures are so astronomical that any change upward or downward results in a completely new outlook. For the present, we obviously must assume that the military requirements will continue to be high and that the civilian supply will not increase."

Condensate Corrosion Study Launched

IN a coordinated effort to combat the serious corrosion being encountered in the pipe and fittings of high-pressure condensate wells, the Natural Gasoline Association of America is sponsoring a cooperative research program having as its objective the determination of the causes and means of eliminating this corrosion.

Major portion of the research program has been placed with the staff of Battelle Memorial Institute, Columbus, Ohio, where Dr. H. A. Pray will conduct and supervise laboratory studies concerned with the metallurgical and chemical problems involved. Dr. Pray has just completed a tour of condensate producing areas in Texas and Louisiana where he observed the serious effects of corrosion and discussed with technical men the various efforts already made to combat it.

Field Experiments Planned

Supplementing the work at Battelle Memorial Institute, it is planned to have full scale experiments carried on in the field by the staff of some southwestern institution as yet unselected. It is felt that this broad approach to the problems through both laboratory and field studies by independent agencies whose data and activities are correlated and supervised by a central research project committee will give the most comprehensive results in the shortest time. This committee will also serve as a clearinghouse for corrosion research data developed by individual companies and has arranged for cooperative exchange of information with the U. S. Bureau of Mines and the American Petroleum Institute.

According to William F. Lowe, N.G.A.A. secretary, it is expected the project will be continued for at least 3 years because the type of corrosion being studied is particularly baffling and presents some new and exceedingly complex problems. The annual budget has been set at $20,000 which is being raised by subscription among interested companies.

At a recent meeting in Houston organizational plans were completed and T. S. Bacon, director of research, Lone Star Producing Co., Dallas, was made chairman of the newly formed corrosion research project committee. Other members of this group include: Dr. R. G. Atkinson, Shamrock Oil & Gas Co., Amarillo; W. A. Bowser, Atlantic Refining Co., Dallas; Walter Dayhuff, Standard Oil Co. of California, Los Angeles; J. M. Dillon, Jr., Shell Oil Co., Inc., Houston; J. M. Flaitz, Distillate Production Corp., Houston; R. W. French, Continental Oil Co., Ponca City; T. W. Johnson, Union Producing Co., Shreveport; W. W. McNeal, Jr., J. S. Abercrombie Co., Houston; T. W. McGuire, Cotton Valley Operators Committee, Cotton Valley, La.; H. T. Pruett, Gulf Plains Corp., Corpus Christi; P. A. Stagg, Superior Oil Co., Houston; C. R. Williams, The Chicago Corp., Corpus Christi; R. T. Wilson, La Gloria Corp., Corpus Christi, and Lester Wood, Phillips Petroleum Co., Bartlesville.

Other contributing companies whose official representatives have not yet been named include Arkansas Fuel Oil Co., Humble Oil & Refining Co., Ohio Oil Co., Magnolia Petroleum Corp., and Stanolind Oil & Gas Co.

In commenting on the growing seriousness of this corrosion, Bacon stated it was difficult to overemphasize its destructive effects. "Occurring as it does in high-pressure wells," he explained, "most of which range in depth from 7,000 to 10,000 ft., or more, there is an unusual hazard. Serious corrosion was initially discovered in the Opelika field in 1942 and was first thought to be peculiar to that field. Since that time, however, it has been found in a number of other condensate fields and the industry is faced with a really menacing problem.

"The corrosion is all internal," Bacon said, "and cannot be observed except by teardown inspection. It is not continuous throughout the well fittings but is spotted at unexpected locations in the surface connections or may appear 400 ft. down the tubing. In some cases destruction of a christmas tree has been so rapid, replacement has been necessary within 90 days while in others the corrosion has been at a much slower rate. Repairs on some wells where tubing failed because of corrosion near the top have cost from $50,000 to $70,000 per well. With these facts in mind, it is rather easy to understand why the industry is so interested in discovering the cause and cure for this expensive and very disturbing element in its operations."

District 2 Manpower Counselor Appointed

WASHINGTON. — The Petroleum Administration for War, as claimant agent for all branches of the petroleum industry, has appointed H. W. Nankervis as manpower counselor in District 2 to represent firms engaged in essential petroleum activities on manpower priorities committees in order that appropriate manpower ceilings, priorities, and rights of referral may be designated by such committees. Nankervis is duly authorized to collect, certify, and make available to such manpower committees whatever data may be required by such committees for their consideration. All questions relating to the establishment of such priorities and ceilings should be addressed to Nankervis at the Petroleum Administration for War district offices, 624 South Michigan Avenue, Chicago 5, Ill.

Likewise, Nankervis has been appointed by regional, state, and area WMC officials as claimant representative for PAW in District 2.

Geologic Aspects of Wyoming And Outlook for Development

by Pierre La Fleiche*

This paper on the significant geological conditions in Wyoming was presented before the summer quarterly meeting of the Interstate Oil Compact Commission. Recent and continuing discoveries of new pools in the state and the probability that Wyoming will be called upon for increasing production of crude oil in meeting rising military and civilian demands focuses renewed interest on the exploratory prospects.

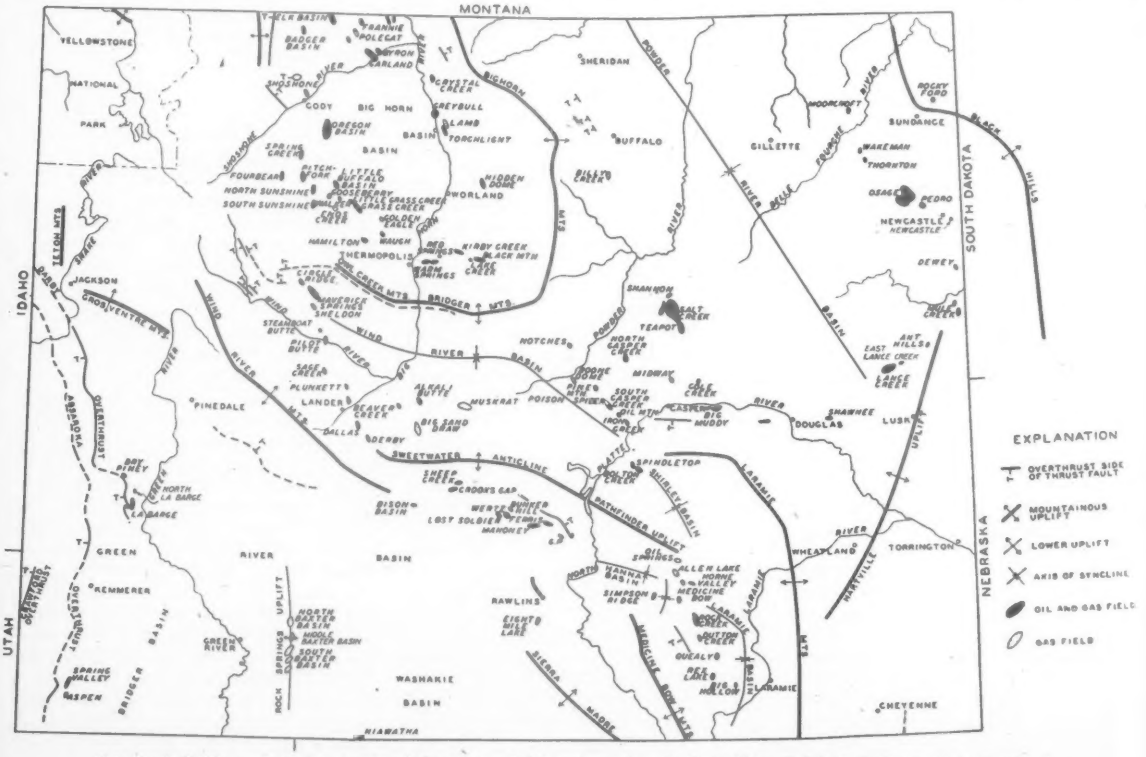
WYOMING is most easily described as a high semiarid plateau broken by northwestern-southeast trending mountain ranges, some having considerable relief. The entire south half of the state has an elevation above 1 mile. The minimum elevation, 3,125 ft., is in Crook County, in the northeastern part of the state, and the maximum elevation, 13,785 ft. The mountains have a direct bearing, from a structural standpoint, on the formation of our many oil and gas fields. The ranges divide the state into about nine great intermountain basins around the periphery of which are found presently known oil and gas fields. Within the interior part of these basins, now relatively untested by the drill, it is believed will be found the oil and gas pools of tomorrow. A brief description of these basins and the related oil and gas fields follows:

In northeastern Wyoming is the great Powder River basin, with an area of about 16,900 sq. miles. This basin is formed by the Black Hills uplift on the east, the Hartville uplift on the south and the Big Horn Mountains on the west. Beginning on the northeast side and proceeding around the rim of the basin in a clockwise manner, is the first oil field of importance, Osage, in Weston County. This field is of special significance because it is not associated with anticlinal folding. South of Osage is the Mule Creek field, and then Lance Creek, a light-oil pool second in importance only to Salt Creek. On the southern limits of the Powder River basin is the Big Muddy field. Northwest of Big Muddy is the Salt Creek field, to date the largest in extent and greatest in yield of any in Wyoming. North of Salt Creek on the extreme western flank of the basin is the Billy Creek gas field.

South of the Powder River basin and in southeastern Wyoming is the Julesburg, sometimes called Denver, basin, this being bounded on the north by the Hartville uplift and on the west by the Laramie Range, and extending into Nebraska and Colorado. In Wyoming, to date, with the possible exception of Horse Creek, no commercial oil or gas fields have been found in this basin.

West of Julesburg is the Laramie basin, this being formed by the Laramie Range on the east and the Medicine Bow Mountains on the west. No oil or gas fields are located on the east of this basin, but on the west side from south to north are situated, respectively, the Box Lake, Queerly, Cooper's Cove (this a recent discovery), Dutton Creek,

*Wyoming state mineral supervisor.



Principal fields and main structural features of Wyoming after C. E. Dobbin, A.A.P.G. Bulletin, Vol. 27, No. 4

Rock River and Medicine Bow fields.

Northwest of the Laramie basin are what is known as the Hanna-Carbon basins, two structural depressions formed on the west by the Rawlins uplift, on the north by the Ferris, Seminoe, Shirley and Freeseout mountains, and on the southeast by the Medicine Bow Mountains. The north and south Allen Lake gas fields are on the northeast side. Situated on an anticlinal high, the saddleback hills, which separate the Hanna from the Carbon basin, is the small Simpson Ridge oil field.

Nearly all southwestern Wyoming is covered by a large geosyncline called the Green River basin which includes all tributaries of the Green River. Inasmuch as this basin is split by a large anticlinal arch called the Rock Springs uplift it may be subdivided into several lesser basins, namely: Bridger formed by the Rock Springs uplift on the east, the Wind River Range on the northeast, the Gros Ventre Mountains on the north and the Salt and Bear River ranges on the west, and the Great Divide basin lying between the Sierra Madre Range on the east, the Rock Springs uplift on the west, and the Wind River Range and Green Mountains on the north. This latter basin is further divided, the north half being called the Red Desert basin and the south part the Washakie basin, the dividing feature being the Wamsutter Arch, a broad, low anticlinal swell juxtaposed to the Union Pacific Railroad.

Red Desert Basin Pools

On the northwest limits of the Red Desert basin are situated the Lost Soldier, Wertz, Mahoney dome and Ferris fields, and on the southwest margin of the Washakie basin are the Hiawatha and Powder Wash Tertiary productive oil and gas fields, the former being in part and the latter wholly in Colorado.

The Rock Springs uplift is itself an extensive gas field, local structural highs being called South, Middle and North Baxter basins.

On the southwest side of the Bridger basin in the extreme southwest part of Wyoming is the Spring Valley field never productive of any great quantity of crude but one of the oldest oil areas in the state. On the west side is the LaBarge field, productive of light oil in the Tertiary, and on the northwest a gas area is found in the Tertiary west of the town of Big Piney.

The Wind River basin in Central Wyoming is bounded on the north by the Owl Mountains, on the west by an anticlinal arch connecting the north extension of the Laramie Mountains to the Big Horn Mountains, on the south by the Rattlesnake and Granite mountains, and on the west by the Wind River Range. This basin has on its eastern limits the Iron Creek, South Casper and Poison Spider and Notches fields, on the south the Sand Draw, Muskrat and Alkali Butte gas fields, to the southwest Dallas and Derby, to the west the Lander, Winkleman, Pilot Butte and Steamboat oil fields, and on the northwest Maverick Springs and Circle Ridge.

In Northwest Wyoming, bordered on the east by the Big Horn Mountains, the south by the Owl Mountains and on the west by the Absaroke Mountains lies the Big Horn basin. This fulfills the geologist's dream. It is on anticlinal profusion. Here are found 33 productive oil and gas fields within a maximum radius of 60 miles from the basin center. Considering only the more important and commencing on the north at the Wyoming-Montana State line and proceeding in a counterclockwise order around the rim of the basin, are the Frannie, Byron, Garland, Elk Basin, Badger, Oregon Basin, Little Buffalo Basin, Grass Creek, Golden Eagle, Wagonhound, Hamilton Dome, Gebo, Warm Springs, Black Mountain and Hidden Dome oil and gas fields.

Beginning in the Cambrian and through the succeeding geologic periods, Wyoming has been, for the most part, submerged under extensive oceans and inland seas with an occasional emergence into fresh water conditions, shallow lakes and intervals of erosion. It was not until late Cretaceous and during the Tertiary periods that extensive continental sediments were laid down. During this period, sediments of a maximum thickness of 30,000 to 50,000 ft. were deposited consisting of limestones, shales, sandstones and kindred materials. The diastrophism of the region commenced in the late Cretaceous but was most prominent during early Tertiary when crustal folding and deformation formed the mountain ranges and basins much as they are known today. Simultaneous and subsequent erosion during this process has removed much of the sedimentary strata from the mountain ranges and exposed the pre-Cambrian core of basement rocks. Thus, are exposed for examination and study most of the series of sedimentary strata which is present in the basin regions. From such exposures, and also by scrutinizing the cuttings obtained from drilling wells, the nature of the sediments constituting the basin formations may be determined with a fair degree of accuracy.

Foremost among Wyoming's oil fields is the Salt Creek field in northeastern Natrona County. It has a productive area of 20,500 acres and 2,383 wells have been drilled in the field proper. Production is obtained from the Shannon sand, Niobrara shale, first, second and third Wall Creek, Muddy, Dakota, Fuson, Morrison, Sundance and Tensleep sands which extend through the geologic time periods from the Cretaceous through the Pennsylvanian. The first Wall Creek sand has produced about 45,000,000 bbl., or about 18,000 bbl. per acre, and the second Wall Creek sand about 230,000,000 bbl., or a yield of about 11,000 bbl. per acre. The Salt Creek field has produced over 308,000,000 bbl. of oil, or over twice as much oil as produced in all the states bordering Wyoming.

Lance Creek, in Niobrara County, has produced over 56,000,000 bbl. of light, high-grade oil of above 40° gravity, A.P.I.; Grass Creek, in Hot Springs County, has yielded over 32,000,000 bbl., and Big Muddy in Converse County, over 28,000,000 bbl. of oil.

Oregon Basin, in Park County, productive of black oil from the Madison, Tensleep and Embar formations, has a cumulative total of over 25,000,000 bbl., and is but sparsely drilled.

Lost Soldier Phenominal

The Lost Soldier field in Sweetwater County has had a most phenominal yield, considering its size. The productive area of the Frontier sands is about 160 acres; the Dakota, Sundance about 320, and that of the Tensleep a little over 640 acres. These formations have produced to date over 27,000,000 bbl. The recovery, not including that of the Tensleep, has been over 60,000 bbl. per acre, and much remains to be produced.

The LaBarge field was the first to produce oil from sands of the Tertiary. The Tertiary was long condemned due to its nonmarine origin. LaBarge has produced about 9,000,000 bbl. from a productive area of 600 acres.

Wyoming produces nearly every grade of oil known to the industry from light distillate of 60° to 70° gravity, to heavy viscous, high-sulfur crudes of from 11° to 30° gravity. Oils produced from formations from the Jurassic period through the successively younger rocks to and including the Tertiary, are light green, of a paraffin to mixed base, having less than 0.5 per cent of sulfur and of 30° to 70° gravity A.P.I. The oils produced from formations older than the Jurassic are heavy, black, mixed to naphthene base, of 14° to 30° gravity and a sulfur content ranging from 1 to 3-4 per cent. For practical purposes, oils are placed in two categories, light and black oils.

Given impetus by the demands of war for petroleum and its products, exploration and wildcat drilling in Wyoming is on an ever-increasing tempo. During the 1½ years a re-

markably high percentage of completed wildcat wells has resulted in discoveries of new pools.

A discovery in the Tensleep sands in the old Elk Basin field, in Park County, in December 1942, opened up a new major pool which is being extensively developed. Over 200 ft. of saturation are found in the Tensleep sand, and wells completed have an initial productive rate of from 1,000 to 6,000 bbl. per day. It is estimated that about 5,000 acres will be productive and a reserve established in the order of 200,000,000 to 300,000,000 bbl. The crude is about 30° A.P.I. gravity and of high-sulfur content.

Winkleman Discovery

In February 1944, a new discovery was made on Winkleman dome, in Fremont County. Saturation was found in the Embar lime from 2,595 to 2,875 ft. and in the Tensleep from 2,915 to 3,205 ft., the latter sand only at present being produced. This well had an initial production of over 800 bbl. per day and establishes a substantial addition to Wyoming reserves.

A new pool was established for the Steamboat Butte field, Fremont County, also in February 1944, by a discovery in the Tensleep sand at about 6,771 to 7,034 ft. This well will flow at a rate of over 200 bbl. per day and pump a much greater amount.

Gebo is a discovery made late in 1943 in the Embar topped at 4,641 ft. Discovery well will produce over 2,000 bbl. per day, of 28° A.P.I. gravity oil.

Little Buffalo Basin, long a gas field productive from the Frontier sands, was proved for oil production in the Embar and Tensleep by a well completed in late 1943. This well and one recently completed (June 1944) definitely prove the Embar-Tensleep formation to be a reserve of major importance.

The Wagonhound structure, in Hot Springs County, was proved for production in April 1944. Saturation in the Embar was acidized and it eventually yielded black oil at the rate of 400 to 500 bbl. per day.

Cooper's Cove, situated in Carbon County, was proved as a new field in April 1944, by discovery of light oil in the Dakota series from 4,834 to 4,910 ft. Initial tests indicate a yield of about 1,000 bbl. per day of 33° gravity oil.

Late in June of this year a new pool in the East Lance Creek field, Niobrara County, was discovered in the Dakota sands. Also late in June a well on the Golden Eagle structure, in Hot Springs County, developed a flow of 8,000,000 to 10,000,000 cu. ft. of gas and several hundred barrels per day of 60° gravity oil from the Muddy sand at a depth of 6,700 ft. This opens a new pool for this field which was formerly productive of gas only from the Mesa Verde sands.

Spence dome, in Big Horn County, was opened as a new field in February 1944, by acidizing an old well in the Amsden lime which had previously logged only a showing of oil. An initial yield of over 200 bbl. per day was obtained. The productive horizon is found at a depth of only 410 ft.

On January 1, 1942, Wyoming had an estimated reserve of 514,000,000 bbl. of oil. Discoveries since of new pools and new fields have increased this amount considerably, and estimates of present reserves are in the order of from 750,000,000 to 1,000,000,000 bbl. It is doubtful if any other state can show such substantial additions during the same time.

Wyoming had produced, to January 1, 1944, about 597,000,000 bbl. oil and about 1,000,000,000,000 cu. ft. of natural gas. The present production of oil is about 95,000 bbl. per day. There are a total of about 110 variously classified fields which have produced oil or gas. On January 1, 1944, there were about 3,338 producing oil wells and 131 gas wells in the state.

Geologic Anathemas Flop

Wyoming has been constantly confronted with geologic anathemas and imprecations which may have been ideally conceived but have proved scientific flops. It has been said that a Wyoming structure must have at least 1,000 ft. of closure else the artesian waters have flushed out all the oil; that some structures were too badly faulted, that one was too large, that the Dakota was a blanket sand and could contain only water; that if the Frontier sands were unproductive it was futile to drill deeper; that Tertiary rocks were nonpelagic of origin and barren of source sediments and therefore void of oil or gas, that stratigraphic traps in the Rocky Mountain region were not favorable. All these theories have been definitely exploded. Sand and reservoir rocks below a depth of 6,000 ft., some theorists hold, are so thoroughly indurated and cemented that they lack reservoir space. This will be exploded, also.

In Wyoming the latch string is out to the oil man. For a filing fee of $32 any ordinary private citizen of the United States may secure a prior right and an option on the oil rights on 2,560 acres of public lands of the United States, and for 50 cents an acre a lease good for 3 years without further payment. Or for 25 cents an acre an operator may secure a lease on the lands of the State of Wyoming in most any reasonable amount he may choose and without competitive bidding. These two classes of lands comprise a greater portion of the area of the state. Given a fair and reasonable price for our oil, adequate transportation facilities, and a place in the national market that may be enjoyed equitably by all producers, large and small, Wyoming will soon take its rightful place as one of the leading oil-producing states.

Bethlehem Supply Co. Buys Corsicana Firm

Bethlehem Supply Corp., Tulsa, last week acquired American Well & Prospecting Co., Corsicana, Tex., it was announced by Guy A. Thompson, executive vice president of the purchasing company. American Well & Prospecting, which manufactures oil-well equipment, is credited with having helped many operators by perfecting rotary tools used in drilling operations. At present the company is devoting much of its plant to production of war equipment. J. E. Rittesbacher, president and general manager of American Well & Prospecting, will remain with the continuing organization as plant manager.

DEATHS

John Coulter Means, 75, independent oil operator, died July 25 in Houston. For many years he was president of the old Texas & Louisiana Lumber Co.

Herman E. Seeley, 62, retired oil producer, died July 28 in Derrick City, Pa.

Donald C. Laskey, associated with his father, Charles G. Laskey, in oil and gas operations in Shreveport, La., died in that city July 26. He was on the legal staff of Southwest Natural Gas Co.

Samuel Morse Chenault, 56, oil operator in eastern and western Kentucky fields, died July 22 in Mount Sterling, Ky.

Jack T. Scott, 38, landman for Pure Oil Co. in Midland, Tex., died July 24. Before joining Pure a year ago, Scott was in the abstract business in Lovington, N. M.

John Albin Larson, 47, filterhouse operator for Kendall Refining Co., died July 23 in Bradford, Pa.

John A. Hosack, 72, oil man of Blackwell, Okla., died July 29.

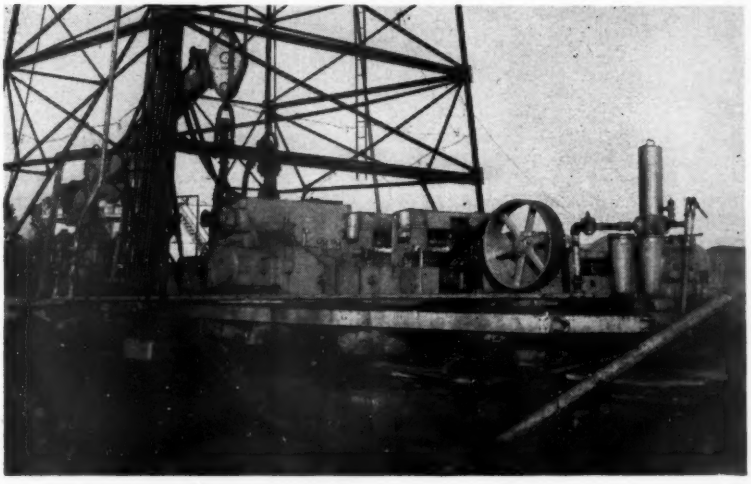
O. L. Brandenburg, 52, for 26 years oil dispatcher for Cities Service Co., died July 29 in Bartlesville, Okla.

Louis Ruban, 69, oil operator of Wichita, Kans., died July 31.

Multiple Sands Complicate Completion Problems in Eucutta Field

by Neil Williams

Close association of water with oil in multiple-zone sand sections of relatively small productivity and low pressure is necessitating careful determination of casing-perforating levels to effect exclusion of water in well completions. Numerous squeezing and reperforating operations with extensive employment of drill-stem testing and other means of evaluating zones of saturation often are required.



Gasoline-engine workover rig in Eucutta field engaged in plugging back and recompletion work

MULTIPLE, thin, broken sands having relatively small individual productivity and little or no pressure are characteristic of the producing sections in the Eucutta field, Wayne County, eastern Mississippi. The situation is creating a number of difficulties and complications in completion of wells. Chiefly, these complications concern the extent of casing perforations and isolation of water-bearing zones.

Principle sands currently being developed comprise a section of about 150 to 200 ft. in the upper part of the Eutaw formation, of Upper Cretaceous age, topped at depths varying from 4,850 to 5,100 ft. An additional series of sands, in which several wells have been completed, exists in the underlying Tuscaloosa formation at depths of from 5,800 to 7,000 ft. Wells drilled into the Lower Cretaceous below the Tuscaloosa have found additional potential sands although so far no completions have been made in them.

Within the Eutaw section, the zones of saturation are so numerous that separate testing to determine their individual productive ability is not usually feasible. In view of their close stratigraphic association and similarity of production no attempt is made to segregate the sands. Consequently, the practice in completion of wells generally is to take in the entire range of productive sands, perforating casing in each of the various zones of saturation as identified by cores and electrical logs.

Two main sand bodies, identified as the City Bank and Stanley sands, extend through the section, the latter coming in about 70 ft. below the top of the first. However, points of oil saturation in both sands vary considerably between wells, in number, levels, thickness and extent. With other sands and oil zones of varying number and thickness interspersed throughout the sections, extreme exactness is required in perforating casing to insure taking in all the oil saturation possible and at the same time exclude water zones.

PERFORATION RECORD ON FIVE WELLS

Well	Thickness of section (ft.)	Footage perforated (ft.)	No. levels perforated	No. shots
A	193	106	9	636
B	156½	76½	7	399
C	228	157	12	906
D	179	118	8	708
E	245	135	14	810

Thickness of individual zones perforated ranges from as little as 3 to 4 ft. in many instances, to 25 to 30 ft. in others. The frequency and relatively close intervals at which these zones occur and number of perforations which may be made in each are indicated in the perforation record of one of the wells (Well E of preceding table):

Zone perforated (depth ft.)	Thickness of zone (ft.)	No. shots
4,967-4,977	10	60
4,980-4,985	5	30
4,994-4,998	4	24
5,009-5,024	15	90
5,027-5,035	8	48
5,047-5,059	12	72
5,082-5,103	21	126
5,121-5,141	20	120
5,144-5,149	5	30
5,133-5,157	4	24
5,161-5,165	4	24
5,167-5,177	10	60
5,181-5,188	7	42
5,202-5,212	10	60
Total	135	810

Practice has been to core and drill entirely through the section, mak-

ing drill-stem tests at one, two or sometimes three different levels, run an electrical-logging survey from bottom to pick the points of oil saturation and water contacts, and then set and cement the oil string on bottom. In some instances sidewall cores also have been taken. After perforating at all the various desired levels an additional drill-stem test is generally made with the tool run on the tubing. Preliminary to completion, swabbing is practical to clean the hole, and provide an initial estimate of the ability of a well to produce.

Reworking of Wells

All wells are completed on the pump as pressures are not sufficient to flow production. No free gas is present and maximum pressure does not exceed 200 lb. With few exceptions, all wells have made water in varying quantities upon completion, pumping from 200 to 300 bbl. of fluid daily per well. A water drive is indicated, which is expected to assist in recoveries. Gravity of the oil from the Eutaw section runs from 22° to 24°, although in one well the gravity is 30°.

Reworking of several wells is being undertaken in an attempt to exclude water production. This calls for squeezing of first perforations and reperforating at more restricted levels. Difficulties lie in the determination of sands in which first perforations failed to shut out the water. In some instances use is made of the gamma ray in radioactive logging to recheck sands and saturation points behind the casing. The procedure of isolating the water involves reperforating in successive sands at various levels from bottom up, drill-stem testing them in turn, and selecting the most favorable zones for final recompletion. Because of the multiplicity of sands and proximity of the water with the oil in most of the sands, this often may be a long and tedious operation, embracing numerous perforating, squeezing and reperforating jobs, and frequent drill-stem testing.

Testing of Individual Sands

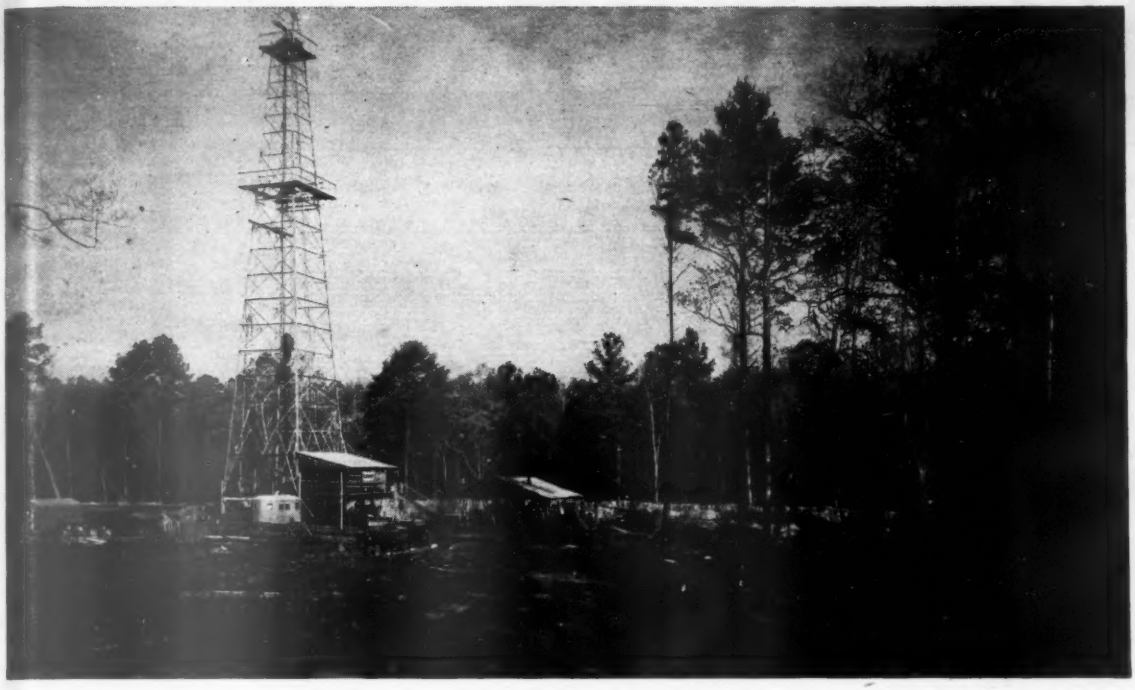
A few wells have been completed initially by this procedure, being put on production only after successive perforating, reperforating and drill-stem testing of various individual sands, and confining completion to more limited section. This also may involve some uncertainties with the possibility of isolating a good productive zone, as was indicated in a recent well which was testing a 7-ft. zone of indicated saturation in a 59-ft. sand section. Starting to test the sand, the well swabbed oil with a trace of water. As swabbing continued, water increased rapidly, until the well was making 100 per cent water. Further swabbing failed to show any oil, and decision was made to squeeze perforations in that zone and reperforate another. Before doing this, the well was allowed to stand, after which as a last chance the swab was run again. This time, the well yielded 100 per cent oil. Testing then was resumed and with continuous swabbing no additional water appeared.

Twelve wells have been completed in the field. Of these two were abandoned as dry both in the Eutaw section and in the Tuscaloosa, due to faulted conditions. Four of the remaining wells also were drilled to horizons below the Eutaw, three going well into the Lower Cretaceous and one only into the Tuscaloosa. Two of these failed to find production in either the Tuscaloosa or Lower Cretaceous and were plugged back and completed in the Eutaw. The other two of the four, one of which was the discovery well, were completed in the Tuscaloosa. The discovery well, drilled for Gulf Refining Co., since has been plugged back to the Eutaw sands. In the Tuscaloosa, it had 26 ft. of saturated sand in the top of a 100-ft. sand section topped at 6,666 ft. and pumped initially at the rate of 150 bbl. of 19°-gravity oil daily. However, it shortly started to make considerable water.

The thoroughness with which the potentialities of the multiple sands are being exploited and some of the difficulties being experienced in completing wells are indicated in a well lately completed by Humble Oil & Refining Co. This well which found the Eutaw sands unproductive

Above: Typical pumping well in Eucutta field. Gasoline engines are used for power

Below: Steam-powered drilling rig in the Eucutta field, showing truck-pulling unit (right) swabbing well during test



Deep test drilling by Humble Oil & Refining Co. in Eucutta field employing diesel-electric rig, with mud-logging trailer in foreground

was drilled to a total depth of 7,031 ft. stopping in the Lower Cretaceous, topped at 6,908 ft. Numerous showings were found through the Tuscaloosa sand sections which were cored and tested as drilling proceeded. A total of 261 ft. of hole was cored from 5,843 ft. to bottom. This included two cores at 5,843-53 ft., one at 5,920-24 ft., another at 5,948-56 ft., and continuous coring from 5,956 to 6,042 ft. and from 6,868 ft. to bottom, the latter a section of 163 ft. In addition seven preliminary drill-stem tests were run in various sands, including two in the Eutaw at 5,108-18 ft. and 5,188-5,220 ft., and five in the Tuscaloosa from 5,838 ft. to 6,647 ft. Two electrical logs were made, the first with bottom at 6,868 ft. and the second upon completion of the hole. Also, 18 sidewall cores were taken at various points. Electrical logs were supplemented by a gamma-ray survey from bottom, where a dip meter also was run.

For completion tests, 7-in. casing was set and cemented at 6,958 ft. Working from bottom up, a succession of five different drill-stem tests were required before oil production finally was established, with perforating levels in turn at 6,828-31 ft., 6,726-30 ft., 6,226-30 ft., 5,952-58 ft. and 5,830-44 ft. In all instances except the last, the tests showed salt water, and the respective perforations were squeezed. To insure complete shut-off between each testing level, intermediate perforating and squeeze jobs were made before perforating to test the next successively higher level. On the final perforation at 5,830-44 ft., the test showed oil with some fresh water. After running tubing and swabbing to clean the hole and verify the results, the well was put on the pump, producing at the rate of 16 bbl. of oil and 24 bbl. of salt water daily.

Drilling and completing of this well consumed an over-all time of 101 days. Excluding delays in testing and completing occasioned by attempts to shut out water, over-all for wells to the Eutaw sands, has been reduced to from 35 to 40 days.

Drilling Conditions

No particular drilling difficulties or hazards are encountered. Conditions are similar to those in the Heidelberg field, 20 miles to the northwest in Jasper County, which were described in the May 11, 1944, issue of The Oil and Gas Journal, page 111. The producing section also is somewhat similar to that at Heidelberg, except that in the latter field the section takes in the lower Eutaw and Upper Tuscaloosa, is somewhat thicker and sands have greater productivity. In the Heidelberg section at least 15 different sands, 12 in the Eutaw and 3 in the Tuscaloosa, have been identified.

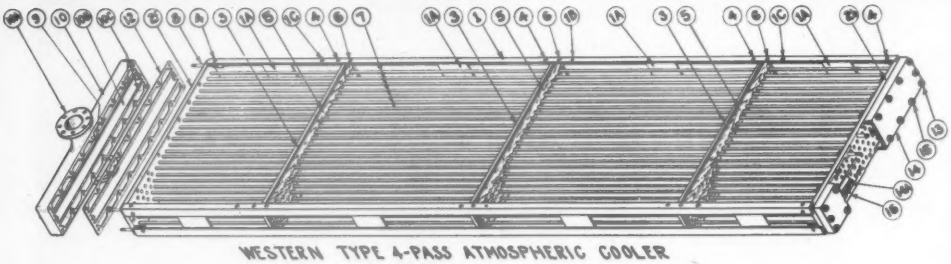
The casing program at Eucutta calls for approximately 1,000 ft. of 10¾-in. surface pipe, with 6⅝-in. or 7-in. casing being run for the oil string. Surface pipe is cemented with from 300 to 500 sacks of cement, while on the oil string 250 sacks are used, exclusive of squeeze jobs. In wells drilled by Humble Oil & Refining Co., approximately 45 ft. of 16-in. conductor pipe also is set to start the hole.

So far the only operators in the field are Humble Oil & Refining Co. and Gulf Refining Co. Contract rigs are being employed, and at present there are nine rigs running.

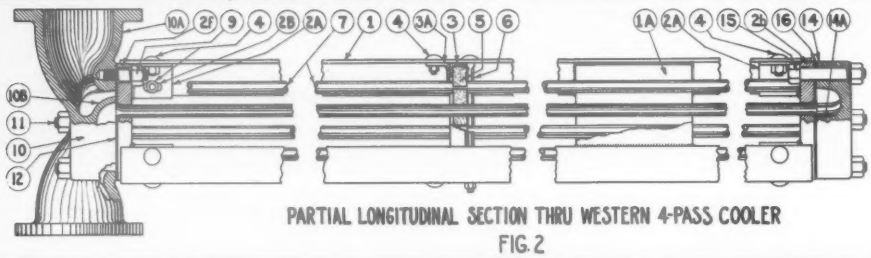
W. A. Alexander, who was chief exploitation engineer and assistant production manager in the Texas Gulf Coast area for Shell Oil Co., Inc., has been named acting production manager to succeed the late H. J. Kemler. **J. Chalmers,** production engineer, has been made acting assistant production manager. Alexander, a graduate of Louisiana State University, joined Shell in 1928 as a production engineer. Chalmers, a graduate of University of California, entered Shell service in 1933 as a production engineer.

H. B. Fuqua, chief geologist for Gulf Oil Corp. in Fort Worth, was advanced August 1 to assistant to **Joseph H. Russell,** vice president in charge of production, and his office will be in Houston. **H. M. Bayer,** zone geologist at Midland, Tex., has replaced Fuqua as chief geologist. **W. J. Hilseweck,** member of the Fort Worth geological staff, has been transferred to Midland as zone geologist. Fuqua, a past president of American Association of Petroleum Geologists, joined Gulf in 1922. He is a graduate of University of Okla.

WESTERN



WESTERN TYPE 4-PASS ATMOSPHERIC COOLER
FIG. 1



PARTIAL LONGITUDINAL SECTION THRU WESTERN 4-PASS COOLER
FIG. 2

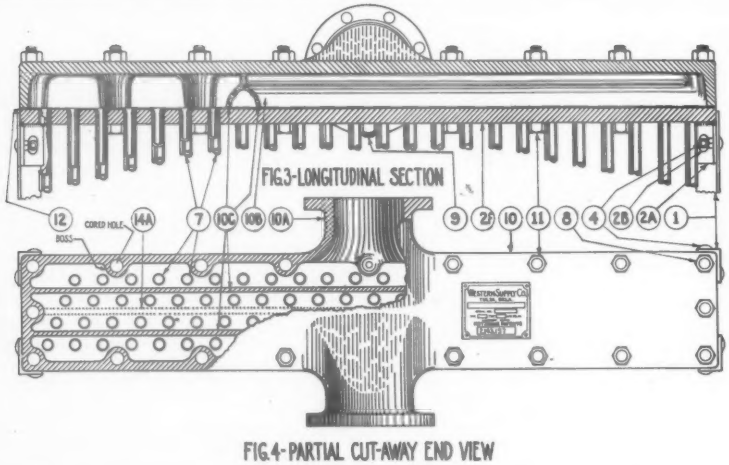


FIG. 3-LONGITUDINAL SECTION

FIG. 4-PARTIAL CUT-AWAY END VIEW

INDEX OF PARTS

1	Angle iron frame
1A	Frame gusset
1B	Carriage bolt hole
1C	Separator bolt hole
2f	Front tube sheet
2b	Back tube sheet
c2f	Cast or special alloy front tube sheet
c2b	Cast or special alloy back tube sheet
2A	Clip angle
2B	Clip angle slot
3	Angle iron tube spacer frame
3A	Spacer frame clip angle
4	Carriage bolt
5	Cypress wood tube spacer
6	Carriage bolt
7	Tube
8	Front tube sheet corner stud
9	Front head center stud
10	Front head casting
10A	Front head nozzle
10B	Front head arcuate rib section
10C	Front head rib face
11	Front head machine bolt
12	Front head gasket
13	Back tube sheet corner stud
14	Back head casting
14A	Back head rib
15	Back head machine bolt
16	Back head gasket
17	Cast clip angle
17A	Cast clip angle slot
18	Corner machine bolt for cast clip angle

ATMOSPHERI COOLERS

ENGINEERS
DESIGNERS
MANUFACTURERS OF

- **All Types Shell and Tube Exchangers**
- **Atmospheric Sections**
- **Submerged Sections**
- **Reboilers**
- **Prefabricated Piping**

This outstanding desig
in atmospheric coolers in
cludes Western's patented 4-PAS
CONTINUOUS UP-FLOW FEA
TURE—providing true counter flow

Prompt deliveries to authorized buyer
Write for illustrated bulletin TODAY!

WESTERN SUPPLY C

P. O. Box 1888 **TULSA, OKLAHOMA** Phone: 8211 - L.D. 243

Practical Elimination of Problems in Handling Sour Gas at High Pressures

by Frank B. Taylor

This article discusses some of the problems encountered in the handling of unusually sour gas at high pressures in two systems in West Texas. Practical field methods employed in reducing these troublesome factors to a minimum are reported.

THE handling of natural gas at high pressures involves a number of problems that are roughly proportional to the pressures. When the gas contains large quantities of hydrogen sulfide, these problems are multiplied. In addition, the amounts of water vapor and oxygen, even if the latter is in minute percentages, further multiply these problems.

Field operations and laboratory tests have gone a long way toward reducing the difficulties of handling excessively sour gas and while each installation has its problems peculiar to the equipment used and the gas handled, there have been certain yardsticks of operation established. Successful and economic utilization of natural gas with high content of hydrogen sulfide is a step toward conservation in that it will allow a broader use and application of this important reserve. Men experienced with the problem stress that while there remain certain difficulties in the field, they should by no means be considered insoluble.

In two systems in the Permian basin of West Texas, in Ector County, gas that varies from 500 to 6,000 grains of hydrogen sulfide per 100 cu. ft., is being successfully handled through two types of installations. Many of the initial problems arising from compounding this gas with high pressures have been solved in the field as a result of practical experience. While difficulties continue they are overcome as they arise.

The gas handled is taken from producing wells at atmospheric, or near-atmospheric pressures, and carried through a gathering system into the gasoline plant and compressor station. No particular difficulties have been experienced on the lines coming into the plant. Internal corrosion, as might be expected, is somewhat higher than would be the case with sweet gas. Every effort is made to keep the lines tight, and maintenance is more exacting than usual.

Within the plant, the gas from the gathering system is compressed through eight 180-hp. and four 230-hp. compressors to 400-450 lb. Scrubbing of the gas at the intermediate stage removes some, but not much, sulfide. Operation of the plant, despite the gas, is continuous although lack of sufficient or experienced manpower is always a drawback. An estimate of maintenance required, while it cannot be exact, suggests that the nature of the gas handled increases normal maintenance 50 per cent as compared with operation where the gas is free of hydrogen sulfide.

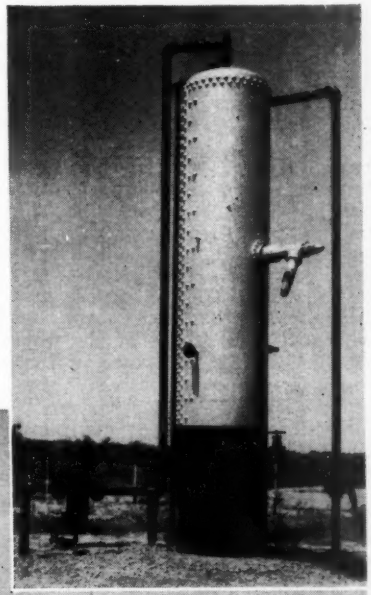
Stainless-Steel Valves Used

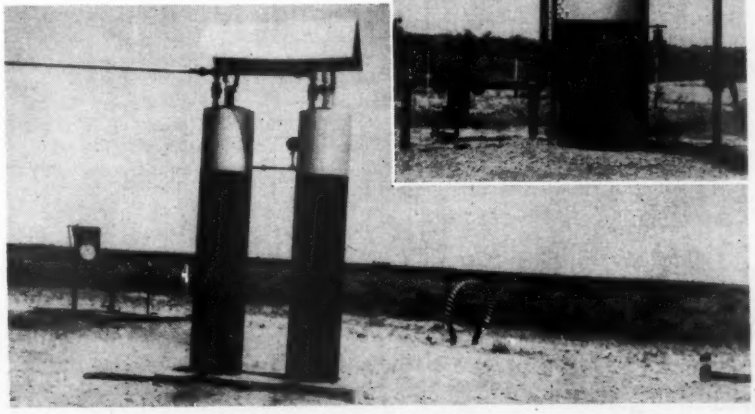
The plant is equipped with stainless-steel valves, operators finding them less subject to the action of the sulfide. For measuring the gas at various stages from input to output, bronze orifice plates are in use in regulation orifice meter manifolds. Incoming gas has the following typical analysis:

Gas—	Per cent
Methane	72.77
Ethane	10.96
Propane	7.98
Isobutane	1.71
n-Butane	3.01
Isopentane	.68
n-Pentane	1.49
Hexanes and heavier	1.40
	100.00

Bronze gives longer service with the gas than do orifice plates of other metal tried in metering equipment. In the case of metering, also, it is necessary to give more than normal attention to mercury pots and floats in order that they are clean and free of drag from collected debris.

Brass condenser tubes are used in the plant and provide an operating period of from 2 to 3 years. This,





This separator at right is being used to reduce the H_2S content of the gas, usually around 2,000 grains per 100 cu. ft. Kerosene is the reducing fluid with the gas bubbling through from the bottom. The knockout to the left of the separator catches any fluids that might be carried over. Volume tanks, below, for the air compressor used to start the large engine. Expansion riser on the suction line is on the right and at left is the meter installation.

and the fact that bronze orifice plates, both metals being ordinarily subject to attack from sulfide and acids that may be formed from it, give evidence of gaining a protective coating after short use which apparently insulates the alloys from continuous chemical reaction and subsequent deterioration. This condition is comparable to the action of copper in establishing a protective coating when exposed to the atmosphere, and is similarly comparable to aluminum which exhibits the same property.

It has been found a desirable practice to use drips wherever possible to collect and from which to discharge any moisture or condensates collecting in the system. A good drip system is considered an essential both on lines and at the plant.

Hydrogen sulfide in the experience of Ector plant operators as well as others is not so serious a problem in itself. It is the reaction of the H_2S with water and oxygen, either inside or outside the lines and in plant equipment that causes the greatest difficulty. Water vapor plus the H_2S results in the acid radicals of sulfurous and sulfuric acid (H_2SO_3 and H_2SO_4) and these readily attack equipment. The problem resolves itself chiefly into eliminating or reducing so far as practical the amount of water vapor in the gas. The same effort tends to lessen the formation of "line ice" or gas hydrates when systems are operated at high pressures and low temperatures in winter months.

While the gas probably carries no free oxygen, pulling of the suction to near atmospheric pressures could bring some air containing oxygen into the system and every precaution is exerted to prevent this. The importance of having a leakless system is apparent, and is equally important in preventing exterior corrosion of lines and connections that are buried. It has been found that where there is escape of gas from the line through any type of connection, exterior corrosion is unusually severe. This is attributed to the action of the escaped gas in following the path of the pipe and combining with moisture in the earth and free oxygen from the air. This reaction would produce the acids necessary to result in exterior attack of the pipe in the areas where failure could do the most harm. Adding to the action would be the electrolysis centralized in such hot spots.

Handling Discharge Gas

The compressors discharge through headers into an outgoing line that delivers about 350,000 cu. ft. per day. Delivery is made only a few hundred yards from the plant at 400-500 lb. The gas at this point is comparatively dry and has a gravity of 0.798, corrected. Hydrogen sulfide content is about 2,000 grains per 100 cu. ft. in the average sample taken from the system.

This system consists fundamentally in the suction line (discharge in relation to the nearby plant) for the compressor and the discharge from the latter station to the injection wells. Necessary auxiliary equipment is required.

Considerable difficulty was experienced in this system in handling the gas at first, although most of the problems have been eliminated or neutralized since the installation was put into service. The station suction is buried at an average depth of 3 ft. but serious freezing during winter months necessitated the removal of sections of the line and blowing out the accumulated hydrates and sulfides. When the location of the ice allowed, alcohol was lubricated to the point nearest the play and this technique usually succeeded in dislodging the ice. However, as these conditions occurred too frequently, an automatic treater-type of alcohol lubricator was installed near the point of gas delivery which effectively reduced freezing cycles to a controllable minimum. The lubricator did not inject excessive amounts of alcohol and therefore was economically practical.

Metering experience during early operation of the system was far from satisfactory. A 4-in. run was put into the line on the compressor suction side, and an orifice meter installed using a 1,000-lb. static spring and measuring the volume passed on the regular 100-in. water-differential chart. Flange taps were used in preference to pipe taps for manifold connection. The manifold proper is the customary setup with bypass for equalizing and bleeding down the meter. The plate used in the flange has a 1¼-in. orifice.

Difficulty was experienced in gaining accurate measurement of supply gas with from eight to nine meter overhauls being required per month. The problems experienced were almost always directly attributable to the sulfide. Being reduced, chemically, in transmission through the line, the iron compound formed would stack up in heavy accumulations on the upstream side of the orifice plate and solidify to such a degree that it required chiseling out of the orifice and off the face of the plate. The accumulation at this point would prevent accurate measurement and this condition became immediately apparent in the recording of the flow.

Particles of the sulfide compounds would frequently break off the accumulation and would move into the low-pressure chamber of the meter. This would cause the float to ride on the compound rather than directly upon the mercury and thus would produce a falsely high differential. The hydrogen sulfide would also emulsify with the mercury to produce measurement error, and at times the float would freeze in the pivot. Gas carrying the sulfide would escape through the stuffing box, distort the packing and would at times form semisolids in the back bearing to retard the free action of the differential pen. Needle valves on the manifold would clog with sulfide and would fail to hold when closed.

Checking Pressures

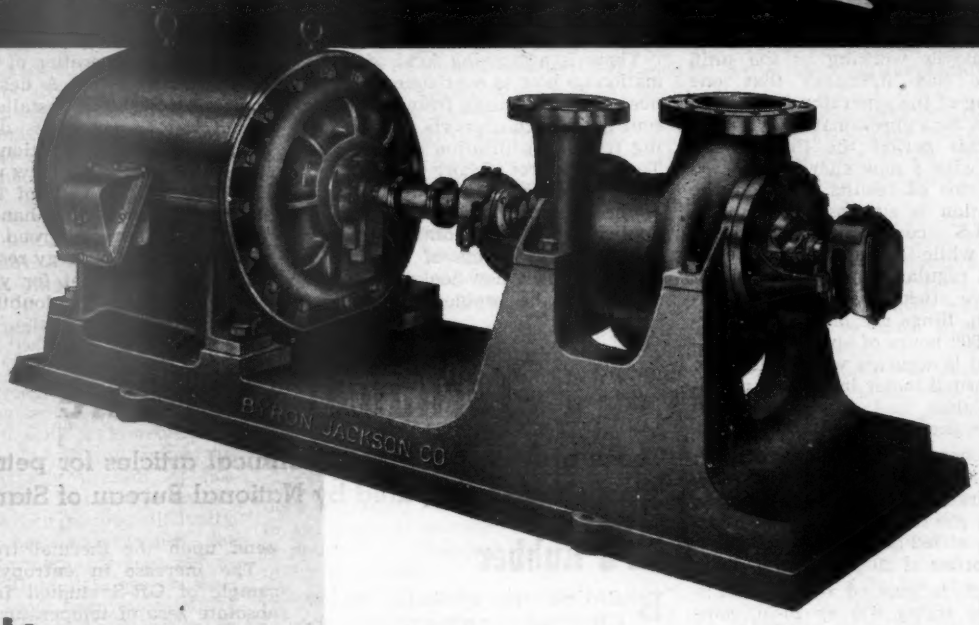
A ½-in. riser out of the 4-in. meter run was used to check pressures against the meter static element but the spring in this gage weakened quickly, elongated and split. The same trouble was experienced in the gage showing the pressure on the discharge side of the compressor. At first the gage unit was carefully protected to eliminate any danger to the operator when reading in case the spring happened to fail at that particular moment. Later, the usual gage was replaced with a mud-pump gage using a fluid seal, preventing the hydrogen sulfide from actually contacting the gage element. This proved successful and eliminated the reading hazard.

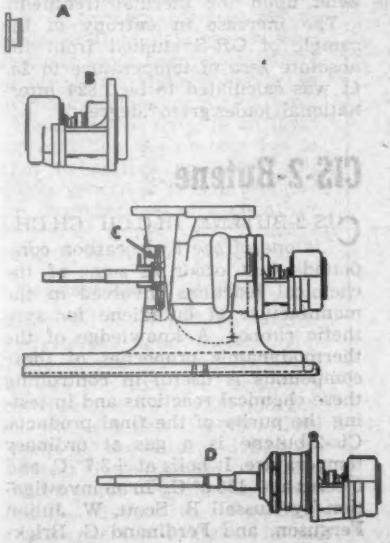
The iron sulfide caused trouble with the compressor valves which had to be removed and cleaned four to five times a month. Valve control equipment at the station and on the lines, including two 4,000-lb. test installations on station suction and discharge, gave difficulty by not seating properly because of accumulations of sulfide beneath the wedge and in the seats. A piston-type check valve on the discharge from the compressor gave some trouble in not closing when needed. This was replaced with a 6,000-lb. swing-check union with a stainless-steel clapper which has proved entirely satisfactory.

With these problems recurrent, the operator supplemented the alcohol lubricator already installed with a high-pressure separator unit on the station suction line. The separator was charged with kerosene. The intent was to reduce the hydrogen sulfide content of the gas to such a low concentration that sustained operation could be counted upon, to reduce equipment-replacement costs and to hold maintenance costs to within practical limits. This installation was in the nature of an experiment but the results amply justified the work.

The separator is charged with 215 gal. of kerosene, and receives the incoming gas at the bottom, in the manner of a scrubbing tower. Dis-

ENTRANCE VELOCITIES *Lower*
NET POSITIVE SUCTION HEAD *Lower*





In dismantling, when the pump half of the flexible coupling (A) has been removed, the sleeve bearing housing and discharge cover (B) are withdrawn as a unit, giving access to the second stage impeller (C) which is removed with a standard impeller puller. Bolts holding the suction cover to case are then removed and the remaining portion of the rotating element (D), including the ball thrust bearing with its housing, the suction cover and the first stage impeller, are removed as a unit. Suction and discharge piping are not disturbed when dismantling the pump.

with
Byron Jackson Hot Oil Pumps

For capacities ranging from 1,400 to 2,000 gpm. with heads from 700 to 1,100 feet at 3,550 rpm, and temperatures to 900° F., Byron Jackson engineers have developed a 6" x 8" x 12½" Double Suction Hot Oil Pump. Contained within a heavy duty, vertically split case with confined gaskets, is a two stage unit, the first stage of which is double suction while the second stage is single suction. Employing this type of construction, initial entrance velocities have been materially lowered permitting operation of the pump at substantially lower npsh.

Staggered volutes provide radial balance, while hub wearing rings on the second stage give axial balance. By bleeding leakage from the second stage hub wearing rings to suction, both stuffing boxes are subjected to suction pressure only. Stuffing boxes are extra deep and both stuffing boxes and bearings are water-jacketed. Stuffing boxes are provided with "in and out" seal oil connections. Bearings are ring oiled.

Byron Jackson engineers have had long experience in pumping liquids of varied viscosity and volatility. This is your assurance that we can be of service in working out your particular pumping problems. The opportunity will be welcomed.

ARMY E NAVY

BYRON JACKSON CO.

Houston • Los Angeles • New York

charge is from the top of the unit through a drip placed adjacent to the separator. The drip retains most of the fluid that carries over and is drained every 24 hours. A safety popoff is provided and set to blow at 500 lb. This is mounted on a riser some distance from the separator installation in order to avoid danger to employes working at the unit. Practice had indicated that one charging of the separator unit would be good for approximately 1 month, after this period the fluid is replaced with a new charge.

In terms of results obtained the installation is successfully combating H_2S corrosion. Compressor valves, while they continue to be inspected regularly, no longer exhibit excessive sticking and are generally clean. Rings are lasting an average of 600 hours of operation. Measurement is accurate with little more than normal meter inspection necessary. Valves and other equipment function properly.

Test shows that the hydrogen sulfide content of the gas has been reduced from the previous magnitude of 2,000 grains per 100 cu. ft. to an average of 882 grains, or a reduction in the order of 60 per cent.

The gas is handled at the plant in a double acting, 4½ by 20-in. compressor, with only one side being used currently, driven by an 80-hp., 16 by 20-in. natural-gas engine operating at 180 r.p.m. Instead of using the sour gas as fuel in the power end, sweet gas from another line is piped to the compressor station. Additional difficulties have no doubt been eliminated by this practice. A totally enclosed water jacket cooling system is used at the station with an air compressor to furnish starting power.

Discharge from the plant is at 1,750 lb. per sq. in. pressure into 3-in., 225 ft. in length. This line and the suction line are protected by expansion joints and by pipe valves set at pressures slightly above the maximum carried.

It is believed that the hydrogen sulfide contained in the gas results in problems only when the gas also carries water vapor or oxygen, or possibly carbon dioxide from which oxygen might be released chemically. Exceedingly dry gas, in the sense of water vapor, apparently can be handled with as little difficulty as sweet gas at the same pressure.

Iron sulfide resulting from the reaction of the sulfide with the steel and other alloys in fittings and lines naturally collects in points of eddy, against obstructions in the gas stream and wherever the pressure may drop. These vulnerable points are usually the very places in which the accumulation would give the most trouble.

Analysis of samples of the residue taken at the intake valve of the compressor shows as follows:

Element—	Per cent
Heavy oil	40
Carbon	10
Iron sulfide	40
Sulfur	8
Calcium sulfate and sand	2
Total	100

There is a growing fund of information on how to overcome the various problems arising from the use of sour gas, which supports the increasing trend to utilization of this West Texas resource. Many installations could not economically support some of the equipment found particularly applicable to the treatment of sour gas, but the success of such units has provided a new tool with which to combat the problem on a large scale.

In the McKamie area of Southwest Arkansas, some 50 tons of sulfur daily are being extracted from the sour gas of the field as an important byproduct of operation. In the Maljamar area of New Mexico, sour gas used in repressuring was found to impart sulfides to the porosity of the formation to such a degree that the operation of the project was endangered. A desulfurization unit now being installed is expected to overcome this difficulty. With the vast reevaluation of natural gas as a source of new products, and with the majority of the original problems in the handling of sour gas well on the road to solution, an increased energy reserve has been established that for years has been considered of doubtful economic utility.

Technical Literature

These abstracts of recent technical articles for petroleum chemists were prepared by National Bureau of Standards

GR-S Rubber

BECAUSE the synthetic rubber GR-S (Government rubber-styrene type), which is the copolymer of butadiene and styrene, is the type of synthetic rubber being produced in much the largest quantity, this material was included in the Bureau of Standard's program of determining basic thermodynamic properties of natural and synthetic rubber and of the components from which they are made. This program, which was initiated more than 10 years ago, has already included work on natural rubber, isoprene, and Hycar OR-15 synthetic rubber. Data obtained from these studies are needed in calculations having to do with: (1) chemical reactions in the manufacture of the monomers, (2) the reactions of polymerization, and (3) vulcanization and other reactions of polymerized material.

In the July issue of the Journal of Research (RP1595), R. D. Rands, Jr., W. J. Ferguson, and J. L. Prather describe measurements of specific heat on the synthetic rubber GR-S from —258° C. (15° K.) to about 60° C. The specific heat at 25° C. was found to be 1.894 international joules.gram^{-1}.degree^{-1}. A second-order transition, one which involves a marked change in the specific heat over a short temperature range, was discovered at about —61° C. Similar transitions have been found in Hycar OR-15 synthetic rubber at about —23° C., and in natural rubber at —70° C. It seems evident that the specific heat values just below the transition, and the transition temperature itself, depend upon the thermal treatment.

The increase in entropy of the sample of GR-S studied from the absolute zero of temperature to 25° C. was calculated to be 1.824 international joules.gram^{-1}.degree^{-1}.

CIS-2-Butene

CIS-2-BUTENE ($H_3C.CH : CH.CH_3$) is one of the hydrocarbon compounds that occur in some of the chemical reactions involved in the manufacture of butadiene for synthetic rubber. A knowledge of the thermodynamic properties of these compounds is useful in controlling these chemical reactions and in testing the purity of the final products. Cis-2-butene is a gas at ordinary temperature. It boils at +3.7° C. and freezes at —138.9° C. In an investigation by Russell B. Scott, W. Julian Ferguson, and Ferdinand G. Brickwedde, reported as RP1592 in the July Journal of Research, the specific heat of solid cis-2-butene was measured from 15° absolute up to its melting point. The specific heat of the liquid was measured from the melting point to room temperature. Vapor pressure and heats of vaporization were measured between —78° C. and +13° C. Using these data, tables of the thermodynamic properties derived from the low temperature calorimetric data were extended to 1,200° C. by calculations using spectroscopic data and the methods of statistical mechanics. The extent of the conversion of cis-2-butene to trans-2-butene, also involved in the making of synthetic rubber, was calculated.

Cementing Method Developed to Seal Perforations in Deep Wells

Refinements in squeeze-cementing techniques developed to cope with problems encountered in drilling deep wells in the West Texas Permian basin are described. Irregularities in deep Ellenburger pay sections frequently require completion on an empirical basis and the cementing method described herein is designed to correct for undesirable perforations.

A PROBLEM that is a direct result of deep drilling and testing is that of successfully squeezing casing perforations. This problem is not limited to any particular area nor to any specific formation. It is an outgrowth of the elements that are a part of deep drilling, weighted and complex drilling muds, high formation pressures, the size of perforations and other less important factors.

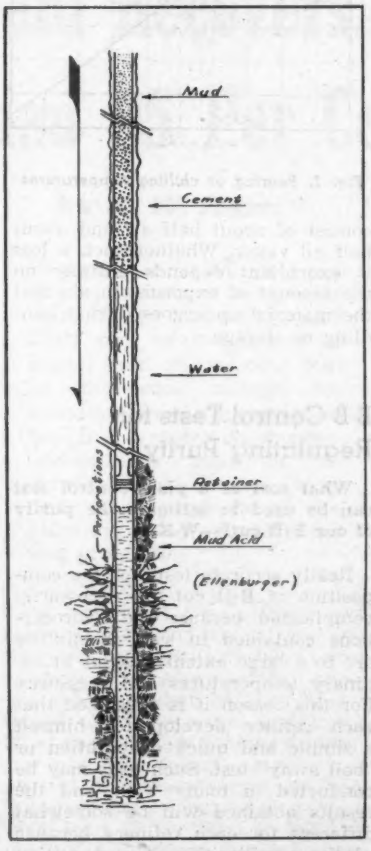
In deep formations in West Texas, perforations in Crane, Winkler, Gaines and Yoakum County wells have been successfully plugged with cement, using advanced technique. The method is only a refinement of past practice, but in nullifying the obstacles normally present, it has proved its worth. In its applications in wells in which serious difficulty had already been experienced, regardless of formation pressures encountered or fluid volumes present, perforations have been successfully sealed off. Ellenburger dolomite, in which most of the operations have been completed to date, is an ideal testing zone for the process for in addition to normal problems, this formation generally is nonreceptive to the introduction of cement or other stable fluids except under theoretically excessive pressures.

Development of Practice

The method developed for cementing perforations is not direct. Typical is the case of one well in which casing was run through irregularly saturated section of the Ellenburger. In this well a series of perforations was made in the saturated section, but on test there was an excessive volume of water with the oil. It was decided to squeeze these perforations and reperforate higher in the well for further testing.

After killing the well, a cement retainer, permitting the well to be tested prior to running the cement, was set between 20 and 30 ft. above the perforations. The mud in the tubing was displaced with water and the well swabbed back in. It was then allowed to flow, making whatever it would, for 18 to 24 hours. By this method, the formation fluids clean the drilling mud from the pay areas exposed by perforations.

After the well has been allowed to flow, a batch of 250 to 500 gal. of mud is lubricated to the retainer and into the formation. The action of the acid is to enlarge the avenues in the formation already cleaned of mud and cuttings and to provide an enlarged void space for the cement. Normal acid has been used in some of these operations but best results appear to be with mud acid type. Water is used to chase the mud acid, displacing it into the formation. Following this a slurry of 50 to 100 sacks of cement is squeezed. A pressure exceeding 6,000 lb. normally is required.



Diagrammed application of the cementing technique as practiced in deep West Texas wells

Drilling mud is used above the cement for adding weight. By using weighted mud instead of water an additional pressure is exerted against the cement without changing the pressure to the depth of the formation and is usually about 2,000 lb. over normal hydrostatic pressure, with water weighing 8.3 lb. per gallon. This procedure reduces the demands made upon surface equipment.

Stages of the operation are controlled through measuring the displacement of the fluid levels. Total time for the plugging operation runs about 48 hours.

This process is somewhat similar to the cementing methods practiced by a number of Kansas operators in shutting off bottom-hole water in Arbuckle lime. In the latter cases, the trouble is not so much in getting the cement successfully introduced into the formation as it is to provide an effective block that will stop or at least reduce water production from the lower section of the formation. In the operation, acid is lubricated into the lime and cement is used following the acid. By opening greater porosity to the cement a more effective blocking action is obtained than without the use of a prerun acid. In the case of the Ellenburger in West Texas, the process is doubly desirable because of the normal tightness of the formation and its consequent reluctance to receive fluids.

Range of Application

The method has been applied at depths of 4,200 and 4,300 ft. in the southern part of the Permian basin and to depths of 10,600 ft. in the north. It leaves the well in good shape as any excess cement can be washed out.

Perforations in tight Ellenburger are cemented off by introducing mud acid, water and cement in the order indicated after the well has been swabbed into production through the tubing.

John H. Ashenfelter has been appointed manager of the personnel division of the industrial relations department for Sun Oil Co.'s Philadelphia general office. This division will be responsible for the personnel activities of all departments of the Philadelphia office. Ashenfelter recently was transferred from the personnel division of Sun's Marcus Hook refinery.

First Lt. Forrest C. Piatt, who was an employe of The Shamrock Oil & Gas Corp., has won the Distinguished Flying Cross and the Air Medal with three Oak Leaf Clusters. He was a navigator on the Fortress Joanne and has been assigned to noncombat duty, after completing the required number of missions over Germany.

QUESTIONS ON TECHNOLOGY

by W. L. Nelson

Chilling or Pouring Temperatures

How cold must petroleum spirits be cooled in order to avoid loss by evaporation? We have in mind a fuel of 7 lb. vapor tension but data on other materials would also be useful.—A.J.M.

No very direct answer is possible because handling conditions may be very different. Nevertheless, if laboratory conditions are contemplated, some scattered information is available. The American Society for Testing Materials specifies a chilling or pouring or handling temperature of 55-65° F. for regular gasolines that are to be distilled by the regular A.S.T.M. method. Likewise for the Reid vapor pressure test, a measuring temperature of 32-40° F. is specified and the same is true for the measuring of natural gasoline which is to be distilled. In part, these temperatures are based on the temperature at which the distillate is expected to be collected or measured, and upon the temperature (32-40° F.) that may be easily obtained with cracked ice. as well as considerations of loss.

Pouring Temperatures

Finally, the American Petroleum Institute in its Code No. 50B, recommends the following pouring (and chilling) temperatures for high vapor-pressure materials:

Reid vapor pressure	Pouring temperature
26 lb. and lower	32-40° F.
26-34 lb.	20-30° F.
32-40 lb.	10-20° F.
38-45 lb.	0-10° F.

An analysis of these data indicates that these agencies considered a true vapor pressure of 300-400 mm. at the pouring temperature to be a safe or satisfactory pouring temperature. Assuming that such a vapor pressure is satisfactory, it is possible to compute pouring temperatures of any common material. Accordingly Fig. 1 indicates the pouring temperatures that are satisfactory for materials whose Reid vapor pressures range from 5 to 45 lb. per sq. in. Note that the handling temperatures for the A.S.T.M. tests fall in reasonable ranges of the figure.

The pouring vapor pressure of 340 mm. used in making the figure, means by Dalton's law of partial pressures that air passed over or through the liquid will carry away an amount of vapor that is about equal to the amount of air that passes over it. In other words, the gas that leaves the material will consist of about half air and about half oil vapor. Whether such a loss is exorbitant depends entirely on the amount of exposure to air that the material undergoes during handling or storage.

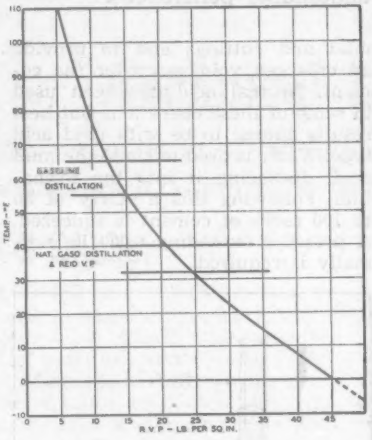


Fig. 1: Pouring or chilling temperatures

B-B Control Tests for Regulating Purity

What sort of a plant-control test can be used to estimate the purity of our B-B cut?—W.K.B.

Really accurate tests for the composition of B-B cut are necessarily complicated because the hydrocarbons contained in such a mixture are to a large extent gaseous at ordinary temperatures and pressures. For this reason it is suggested that each refiner develop for himself a simple and quick evaporation or "boil away" test. Such tests may be conducted in many ways and the results obtained will be somewhat different for each refinery because of the peculiarities of composition of each B-B cut. The situation has been discussed before in these columns—note "Isobutane Plant-Control Tests," p. 47, Dec. 17, 1942, and "Butane and Pentane Content of Petroleum Products," pp. 58 and 60, Aug. 12, 1943.

One refiner conducts his "boil away" test by chilling a 100 c.c. graduate and thermometer by allowing some of the B-B cut to evaporate. He then quickly refills the graduate to 100 ml with fresh material and records initial boiling point by measuring the temperature in the upper part of the graduate. The thermometer is then lowered and evaporation is permitted to take place, meanwhile recording the percentage evaporated at 0° to 5° F. and the percentage evaporated at 40° F. For the particular composition of B-B cut produced at this refinery the amount evaporated at 0°-5° F. is about equal to the propane, propene, and lighter materials, and the percentage remaining at 40° F. is about equal to the isopentane and heavier content of the sample. An indication of the highest-boiling portions can be obtained by taking a new sample and conducting an A.S.T.M. distillation (little or no heat required) for obtaining end point. In a most general way the boiling point of the final residue is about 10° to 20° F. higher boiling than the end point that is recorded. The procedure was established by obtaining low-temperature fractional analyses on a number of samples, and check analyses are made at intervals.

"Boil Away" End Point

H. W. Harts in "Close Fractionation Needed to Recover Isomers From Gas", p. 41, The Oil and Gas Journal, April 24, 1941, discloses the relationship between the "boil away" end point and the percentage of isobutane in mixtures of butane and isobutane. The relationship is probably unsatisfactory for the somewhat impure B-B cuts produced in most refineries, but a similar relationship might be established. Finally, Bull. T.S.-392 entitled, "Tentative Specifications and Tentative Standard Methods of Test for Liquefied Petroleum Gases", of the California Natural Gasoline Association, Los Angeles, presents a weathering test similar to the above except that pressure is used during part of the evaporation. The method was described briefly in the December 17, 1942, issue of this page.

General view of Hawkins plant with fractionators, cooling tower transfer-pump house and compressor section

Hawkins Plant Recovers Isoparaffin Higher Than 95 Per Cent Purity

*by H. W. Harts**

Recovery of 12,000 gal. per day of isobutane in greater than 95 per cent purity, and 6,000 gal. of isopentane of higher than 96 per cent purity, the latter suitable for blending directly into aviation fuel, is a contribution of a natural-gasoline plant in the Hawkins field of Texas. These and other products of the plant are being utilized in the war program.

IN the autumn of 1943, Humble Oil & Refining Co. and Natural Gasoline Corp. entered into an agreement to construct a joint gasoline plant in the Hawkins area of Wood County, Texas. Exhaustive tests were run to ascertain the most efficient type of plant for this particular area. After several weeks of testing, it was found that all wells could be operated with very little pressure on the separators without suffering any loss of gravity. These tests were necessarily very complete in as much as all operators had maintained from 35 to 80 lb. on the field traps since the completion of the wells.

The wells at Hawkins, producing from the Woodbine sand, have an oil-gas ratio of less than 400 cu. ft. per bbl. and the gas is especially rich in the two commercial isomers. The 400 producing wells flow into 250 separators which are all in process of being elevated. The gas from each trap is metered separately and many of the meters are in batteries of from 12 to 18.

At the request of the War Production Board, considerable second-hand equipment was utilized and approximately one-half of the entire plant was available from other locations. The governmental agencies also asked that the plant be designed so as to recover practically all of the isobutane contained in the raw gas. The federal agencies requested the manufacture of both isobutane and isopentane in purities of at least 95 per cent. In the extraction of isobutane, approximately 60 per cent of the propane also is extracted which, after dehydration, is sold as a commercial product.

The following are the analyses of the incoming and stripped gas:

TABLE 1—COMPOSITION OF GASES

Incoming Gas

Component—	Mol. %	G.p.m.
Methane	72.27	...
Ethane	9.76	...
Propane	8.44	2.31
Isobutane	3.13	1.02
Normal butane	2.58	0.81
Isopentane	1.12	0.41
Pentane plus	2.70	1.04
Total	100.00	5.59

Stripped Gas

Component—	Mol. %	G.p.m
Methane	85.70	...
Ethane	10.41	...
Propane	3.68	1.01
Isobutane	0.21	0.06
Total	100.00	1.07

Daily product recovery on the basis of present operating procedure averages approximately:

Product—	Recovery (gal./day)
Propane	15,000
Butane	14,000
Isobutane	12,000
Isopentane	6,000
Gasoline (8.9-lb. material)	15,000
Total	62,000

Gas enters the plant through ap-

*Vice president, Natural Gasoline Corp.

proximately 100 miles of pipe lines ranging in size from 2 to 24 in. There it is boosted through two stages of compression to 200 lb., at which pressure absorption takes place. The gas from each stage of compression is cooled and, during the summer months, is absorbed at a temperature of 85° F.

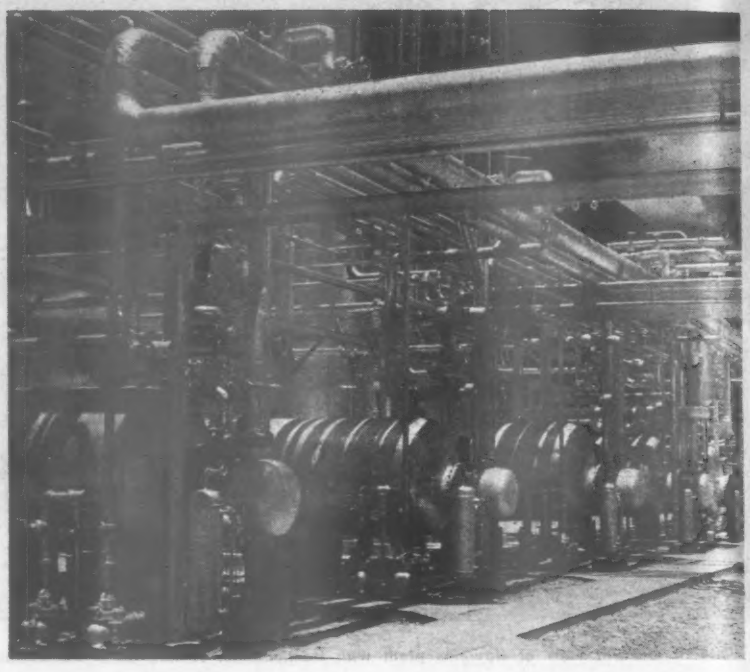
Approximately 16,000,000 cu. ft. of gas is processed daily. A contract has been signed to supply the entire volume of residue gas to a utility company whose lines are in the vicinity of the field.

Oil Circulation Rate

Low molecular weight mineral seal oil of around 176 is circulated through the absorber at a rate of 40 gal. per 1,000 cu. ft. of gas. The oil leaving the absorber travels by gravity through 8,800 sq. ft. of heat exchangers and to the still which operates at 380° F. temperature and 75-lb. pressure. The denuded oil is pumped in series through the oil coolers and back to the absorbers by two steam-turbine-driven centrifugal pumps.

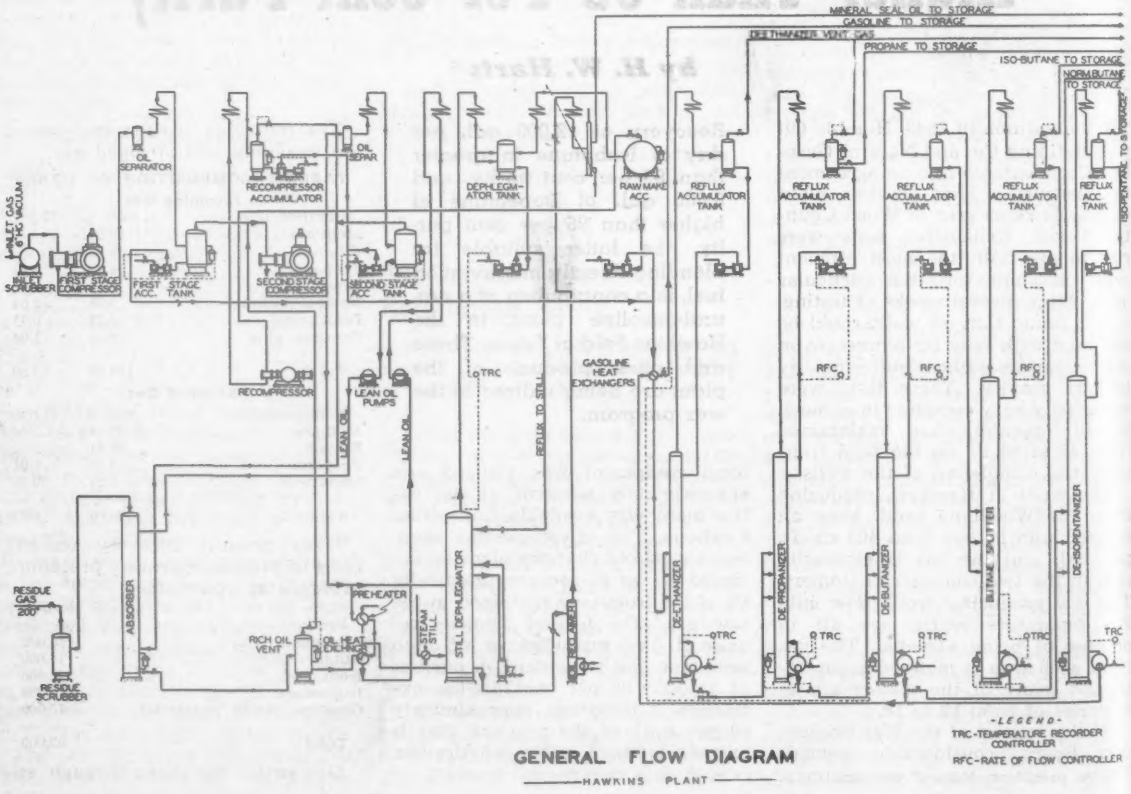
All electric energy in the plant is developed through alternating generators direct-connected to three 150-hp. multicylinder vertical engines. All pumps handling cooling water and finished products are electric-motor driven.

Plant cooling is accomplished in a single atmospheric cooling tower consisting of 35 bays over which approximately 6,000 g.p.m of water is pumped. This tower takes care of not only all plant cooling, but also all engine-jacket water cooling.



Battery of five fractionating columns, showing arrangement of reboilers

From the rundown or accumulator tank, the conglomerate products are pumped to the deethanizer which contains 34 trays and operates at 450-lb. pressure. The reflux tank re-



GENERAL FLOW DIAGRAM

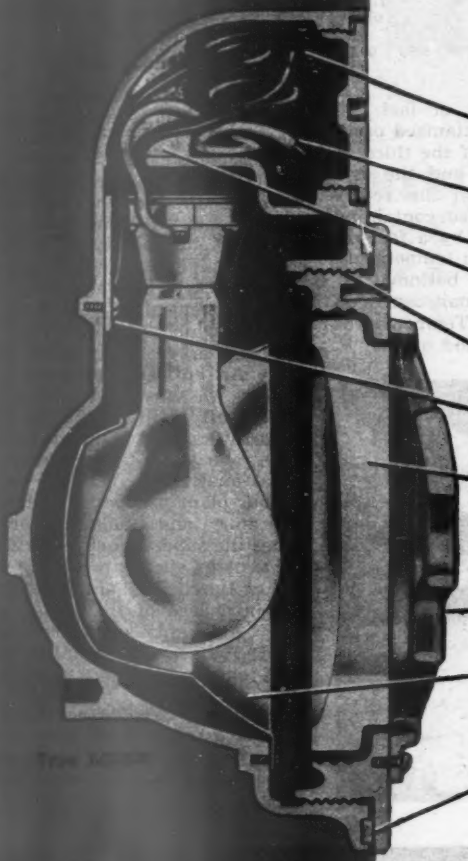
HAWKINS PLANT

In hazardous locations where ordinary floodlights are unsafe because of the presence of explosive atmospheres, you can solve the problem by installing

CROUSE-HINDS

Explosion-Proof

FLOODLIGHTS



Wiring chamber. Ample space for splicing. Easily accessible.

Asbestos covered leads. One wire is grounded to housing for safety circuit.

Cast aluminum or Feraloy (semi-steel) housing.

Factory sealed with sealing compound between wiring chamber and lamp housing. External seals unnecessary.

Flame tight threaded covers.

Adjustable receptacle bracket permits the use of 100, 150 and 200-watt lamps.

Impact and heat-resisting lens. A refracting screen can be furnished to direct the light in any direction, approximately 30 degrees from normal.

Sturdy grid for use where glass is exposed to breakage. Easily removed for cleaning lens.

***Alzak aluminum reflector.** Wide beam for short range. Narrow beam for long range or spotlight.

Gasket of oil and gasoline resisting material furnished if needed.

Write for additional information.

**Alzak is the registered trademark of the Aluminum Company of America.*

ension: surface: for setting

A Nationwide Distribution Through Electrical Wholesalers

Type RLEE-14
500-watt

CROUSE-HINDS COMPANY
SYRACUSE 1, N. Y., U.S.A.

veland—Dallas—Denver—Detroit—Houston—Indianapolis Kansas City Los Angeles Milwaukee Minneapolis Seattle—St. Louis—Washington. *Resident Product Engineers:* Albany Atlanta Charlotte New Orleans
COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

CONDULETS · TRAFFIC SIGNALS · AIRPORT LIGHTING · FLOODLIGHTS

TABLE 2—YIELDS AND PROPERTIES OF PRODUCTS

Component	Raw product	Propane	i-Butane	n-Butane	i-Pentane	Natural gasoline
Yield, vol. per cent	.....	24.2—	19.4	22.6	9.7	24.1+
Yield, gal. per day.	62,000	15,000	12,000	14,000	6,000	15,000
Gravity, °A.P.I.	114.0	146.5	119.4	110.8	105.5	76.0
R.v.p.	.....	.....	.....	.....	.....	8.7-9
Distillation:						
Initial, °F.	.....	—44.0	8.5	31.0	79.8	.....
95 per cent	.....	—43.5	13.0	31.5	82.2	.....
End point	.....	—42.5	14.0	32.5	83.2	.....
Purity, vol. per cent	.....	95.0+	95.08	90.1	96.15	.....

leases ethane vapors which are somewhat contaminated with propane. It operates at the same pressure as the tower. This is the only tower in which total condensation does not take place. From the deethanizer, the product flows under tower pressure to the depropanizer operating at 245 p.s.i. This tower contains 34 trays and the pressure is controlled hydrostatically by the reflux tank. The propane from the reflux tank is dehydrated to pass the cobalt-bromide test and run to storage.

The depropanizer bottoms, consisting of butane and heavier ends, pass from the reboiler by gravity to the debutanizer where the normal and isobutane are taken as an overhead product. This tower, containing 34 trays, operates at a pressure of 130 lb. The column pressure also is hydrostatically controlled.

The butane splitter, which is the only column not in straight-line fractionation, takes its feed from the reflux of the debutanizer. Sixty-four trays are used in the separation of the butanes and the column operates at 108-lb. pressure. The control point for the bottom temperature is in the first or bottom tray and the reflux ratio is held at 14 to 1. In actual operation, temperatures of 130° F. at the top and 160° F. at the bottom are maintained. A typical analysis of the isobutane shows the following content:

Product—	Liquid vol. %
Propane	4.10
Isobutane	95.08
Normal butane	0.82

A typical analysis of the normal-butane fraction from the bottom of the butane splitter tower is as follows:

Product—	Liquid vol. %
Isobutane	0.58
Normal butane	99.10
Isopentane	0.32

The deisopentanizer, or last column, receives the debutanized product from the bottom of the third or debutanizing column and the isopentane is taken from the reflux tank. This column, also containing 64 trays, is controlled by a full reflux tank and the base temperature is controlled from the bottom tray. A ratio of 18 to 1 is maintained on the overhead reflux. Temperatures of 172° F. at the top and of 206° F. at the bottom are maintained. Following is a typical analysis of the isopentane:

Product—	Liquid vol. %
Normal butane	3.85
Isopentane	96.15

Loading and Shipping

A modern truck-loading rack is installed adjoining the plant proper where either liquefied petroleum products or natural gasoline can be loaded. All other products are pumped by centrifugal pumps through five individual lines to the company's loading rack located 2½ miles from the plant.

Safety Features

Following the company's usual safety program, several unique devices were included in the plant. Master controls, any one of which will shut down the entire plant, were installed at strategically located points. All compressing equipment is equipped with automatic shutdowns in case of overheating due to lack of oil or cooling water. All scrubber tanks also have level controls which shut down the compressors in case of liquid carry-over. An entirely independent fire system was installed which operates equally well whether the plant is operating or is shut down.

A robot, low-temperature, fractional analyzer is used to test the various plant products and both the laboratory and analysis work are under the supervision of O. A. Boatright, plant chemist.

Guy Barrit is plant superintendent, in charge of the entire operation. Assistant superintendent is E. H. Hodge, and John Berton is chief engineer.

Left: Battery of 12 orifice meters and regulators in a corner of the plant site. Below: Storage facilities are concentrated in a flood-lighted zone for safety and convenience

suggests the use of a Reamer—Specify

REED HEAVY DUTY REAMERS

And

INCREASE YOUR REAMER SERVICE LIFE . . . *and* LOWER YOUR CUTTER REPLACEMENT COSTS

Reed Reamers are designed and manufacured for long service life and the saving in reamer cutter replacement costs alone will surprise you.

Many operators are using the Reed *extra short bit* Reamer, illustrated on the opposite page, in the deeper abrasive chert formations with excellent results. The body is fully streamlined for maximum slush circulation and the cutters are placed low in the body to closely follow the bit. Reamer cutters on all types are easily replaced on the derrick floor.

REED REAMER CUTTERS ARE DESIGNED FOR LONG LIFE AND EXTREMELY LOW REPLACEMENT COSTS.

CUTTERS AVAILABLE WITH HARD FACING OR WITHOUT HARD FACING.

Reed

REED ROTARY DRILLING TOOLS

SPEED—ECONOMY—DURABILITY

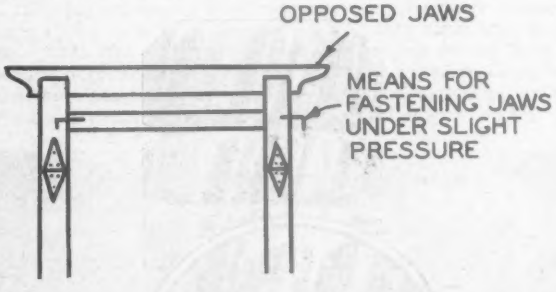
ROLLER BIT CO.
HOUSTON 1, TEXAS

EXPORT OFFICE
836 R. C. A. BUILDING
NEW YORK 20, U. S. A.

PLANT PRACTICES

Clamp for Filing Saws

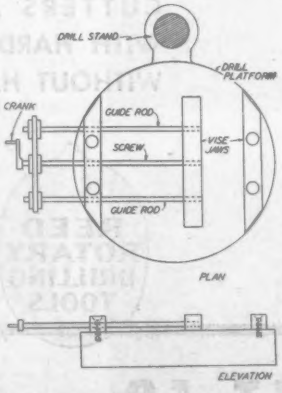
AN improved clamp for holding saws while sharpening them is shown in the illustration. Three-inch wide pieces of 1-in. board are fastened together and braced across to form the body of the clamp. These may be fastened to the side of a work bench or other support permitting the saw filer to operate. Six-inch to 8-in. segments of the top of the front side of the



clamp are sawed through and hinged as shown, those segments not being nailed or otherwise fastened to the back-side pieces. Hooks are attached to these pieces, and screw eyes fitted to the back pieces so that hinged pieces can be hooked to the solid back, holding the two pairs of pieces tightly together. Any other type of clamp holder may be employed for fastening these clamp jaws together. The holding device, such as the hooks are unfastened allowing the front jaws to be drawn away from those at back; the saw is inserted, the jaws closed, and fastened to hold the saw tightly. (Idea submitted by J. T. Macon, carpenter.)

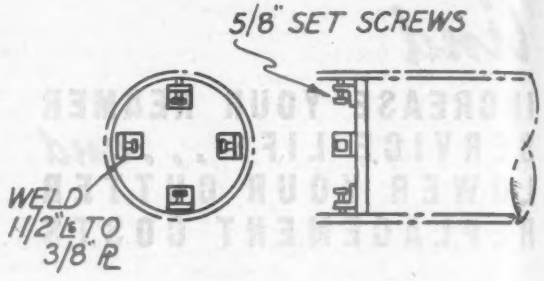
Safety Vise for Drill Press

TO clamp work on the table of a drill press, the illustrated vise is built integrally into the table or an auxiliary rotatable table as shown. A heavy steel strap, 1-in. or more high as desired and of the required length is screw-bolted to the platform at the desired position. A similar one is placed on the opposite side after being drilled with guide holes for the guide rods, and a center hole is tapped for the long machine screw. This screw is collared into the moving jaw so it turns but is not removed, while the guide rods are screwed tight into the movable jaw. The fashioning of the crank end of the operating mechanism is obvious. The arrangement may be set up for either right or left operation as desired. (Idea submitted by N. M. Kunkle, gas plant operator.)



Improved Pipe-Bending Method Seals Sand Cushion in Joint

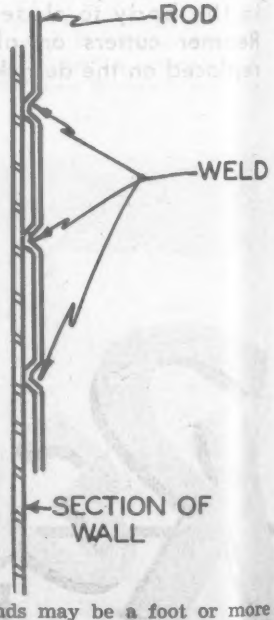
THIS is a device for retaining sand in large pipe, such as 6 to 16 in., when a joint is to be bent. A ⅜-in. thick plate with ½-in. pieces welded to it is used. The welded pieces are threaded for ⅝-in. set screws. The plate is slightly less in diameter than the inside of the pipe which is to be bent. The plate is set into the end of the pipe and fixed firmly in place by tightening the

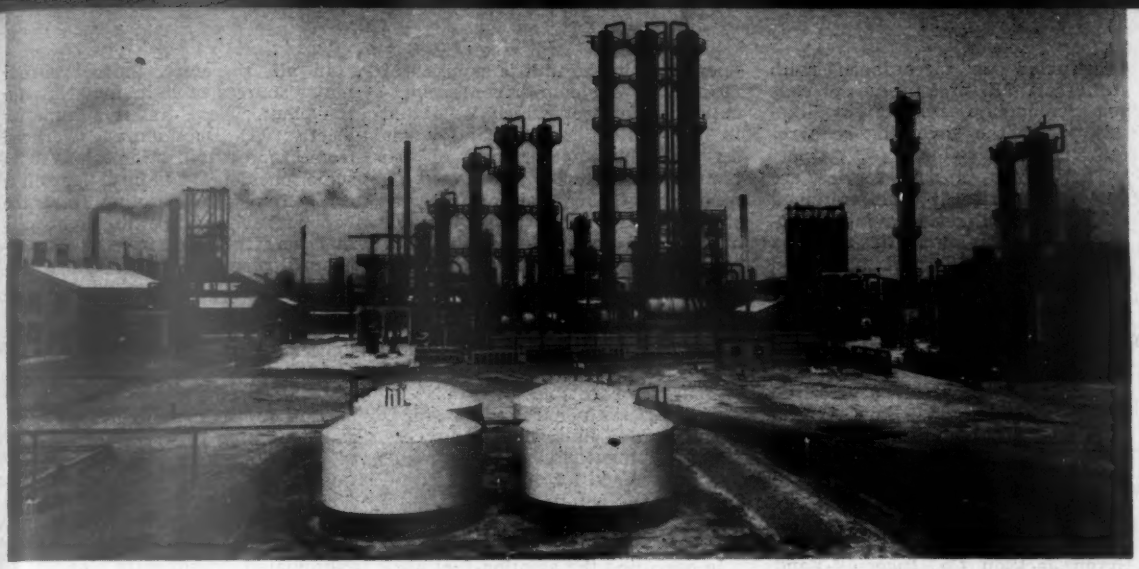


set screws. A similar plate is positioned in the opposite end of the pipe after the joint is filled with sand. A gasket such as a burlap bag may be placed between the plate's edge and the inside of the pipe for more effective seal, if desired. The cap or plate is removed by loosening the set screws after the bending operation is finished. By this method there is no need for threading the pipe ends nor for welding the closure into the ends of the pipe with subsequent cutting off. (Idea submitted by A. J. Jackson, pipe department.)

Method of Attaching Gunite Rods

INSTEAD of hooks welded direct to the shell of a reaction or other chamber to which gunite or ganister type of protective lining is applied, this practice of bending reinforced rods such as of ¼-in. diameter as shown in the drawing, welding these extended rods to the inner wall of the shell at regularly spaced intervals the main body of the rod's length being supported at a distance from the wall. To this extended "ring" wire or other reinforcing material may be tied or spotwelded. No need for accurate spacing of this rod attachment, and they may be spaced as desired. The bends may support the rod at 1-in. space from the shell or other spacing as desired, and the bends may be a foot or more apart in the rod. (Idea submitted by A. L. Capps, welder.)





General view of boiler house, fractionation section, isomerization catalyst chamber, HCl stripper and feed-preparation fractionators

Champlin Aviation-Fuel Plant Exceeding Designed Alkylate Capacity

by Arch L. Foster and R. B. Tuttle

AT the outbreak of war and the tremendous increase in 100-octane number aviation fuel manufacturing plants the smaller refiners were nonplussed as to just what their part could be in the production of this all-important fuel. As the plans developed it became evident that huge sums of money are necessary to build and operate one of these larger combinations of units to make aviation superfuels, and large staffs and facilities in general are required. The small refiner could not see, nor could PAW officials see, how the small refiner could handle such immense plants. However, it was decided that one or more of the units involved in making these fuels could be supplied with feed stock, and operated by the middle-to-small-sized refining organizations.

Consequently, Champlin Refining Co. was one of these refiners who undertook to build and operate two of these units. Plans were made and authorization was issued to this company to build and operate an isomerization and an alkylation unit at Enid, Okla., alongside the company's refinery. These units were to be supplied with stocks from the main refinery, and from such other sources as might prove available and necessary. The products were to be bought exclusively by the military forces, and used for their purposes.

Not only was this venture an interesting experiment by the company's executives, technical and operating staffs as a war venture, but all were interested, as well, in finding out how such a unit fits into the operation of a prewar refinery, and what such an operation might be expected to show in refinery products and in their qualities. The experience gained by these men and others operating these war plants will be invaluable in the postwar era when they face the problem of converting these units to making peacetime products. The construction contract was let to Winkler-Koch Engineering Co., and the plant was started, with assistance from Phillips Petroleum Co.

Main Plant Units

The plant consists of the following: A feed preparation or concentration plant, of three fractionators and such reboiler, heat exchanger, condenser and rundown storage capacity as is required, in which the light hydrocarbons, butenes, pentenes, butanes and pentanes are segregated and concentrated for treatment in the unit; an alkylation unit using anhydrous hydrofluoric acid as catalyst, and an isomerization unit for converting normal butane to isobutane with $AlCl_3$ + HCl as catalyst, both licensed under Phillips patents; and the boiler unit with such other auxiliaries as are necessary.

Grouping of equipment for each of the three main operations is carried out in the layout of the unit in order to simplify the piping arrangement and to provide for convenience in operation.

The important control instruments for each of the operations are located centrally at convenient points within the area; four such centralized points serve the entire unit. Pumps, fractionating columns, heat exchangers and other processing equipment items are segregated by individual operation and type so far as practicable. In keeping with the scheme of over-all compactness the control laboratory and product storage facilities are each located adjacent to the unit.

Reinforced concrete is substituted for structural steel in the construction of all main supporting structures; this substitution was made mainly because of the shortage in structural steel shapes.

All process vessels and exchangers, where service conditions come within the scope of the code, are

constructed in accordance with A.P.I.-A.S.M.E. pressure-vessel code requirements; pressure piping likewise meets the governing code requirements.

The pumps in acid service are vertical, centrifugal type, equipped with special oil seals having an arrangement for automatic flushing. Lubricated metallic packing is used in the glands. Materials and design of the glands were worked out by the John Crane Co.

Automatic flushing is accomplished by means of a pressure control valve regulating the flow of an acid-free liquid to the gland. Flow of the flushing liquid is controlled by pressure differences (up to 15 p.s.i.) between the pump pressures and the oil-seal pressures.

Several types and makes of pumps, as manufactured by the Byron Jackson Co., Ingersoll-Rand Co., and the National Pump Co. are in various services throughout the unit.

Vertical type furnaces are employed as reboilers for the stripping still and depentanizer column in the feed preparation section of the unit. A third similar furnace serves as a reboiler for the alkylate rerun column.

Four Babcock and Wilcox integral furnace boilers supply steam of 225 p.s.i. to the unit. The boilers, which are rated at 45,000 lb. per hour, are supplied with fuel gas at 10 p.s.i. for induced-draft combustion.

Air for the instruments and other operations in the unit is supplied at 60 p.s.i. by a steam-driven reciprocating compressor which is located in the boiler house. Standby air service from another part of the plant is connected to the system for automatically maintaining the desired pressure. All air passes through a purifier before entering the unit.

The control laboratory, which is especially equipped for the unit, is provided with all of the apparatus necessary for thorough control.

Product storage facilities include spheres and cylindrical tanks for pressure storage and the common-type tanks for nonpressure storage.

The over-all unit, including accessory equipment and service facilities, is arranged for operational convenience and safety.

Operation of Units

In operating the aviation-fuel portion of the Champlin Refining Co., crude is first desalted and then sent to the debutanizer tower, where some 6 per cent is removed overhead. This light overhead fraction contains normal and isobutane, isopentane, and heavier hydrocarbons.

A portion of the heavier-than-kerosene fractions of the crude is cracked in two thermal-cracking units at about 940° F. and 400 p.s.i.; and naphtha is reformed in a third still at 1,080° F. and 500 p.s.i. The light hydrocarbons from these cracking operations are sent to the feed preparation unit along with crude debutanizer overhead and compression gasoline.

In all, therefore, there are four major sources of light materials for the plant. These are, to summarize briefly: (1) Debutanizer overhead from crude stabilization, along with some incidental natural gasoline; (2) compression gasoline from the vapor-recovery unit; (3) light olefins, paraffins, etc., from the cracking still gases; (4) olefins and paraffins, etc., from all cracked gasoline. The butanes, butylenes, pentanes and amylenes are separated from lighter and heavier hydrocarbons, and caustic washed with 15° B. caustic. This product then goes to the mercaptan scrubber where 30° B. caustic is used to wash out the bulk of the mercaptans, then the twice-washed raw stock is sent to alkylation charge storage. This charge as mentioned above contains butanes, pentanes, butylenes and amylenes, abbreviated frequently as B.A. charge.

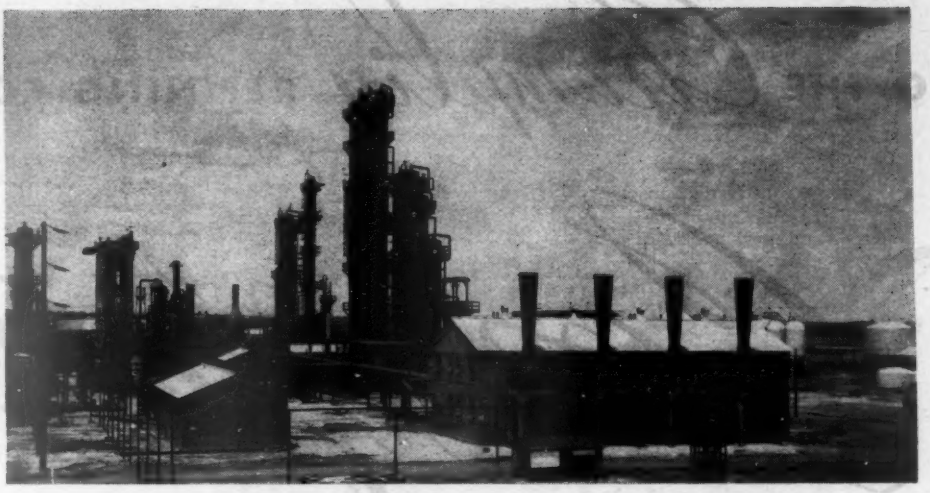
Alkylation Procedure

All raw-stock products are dried with bauxite, and are mixed in a 1:1 ratio with anhydrous hydrofluoric acid (HF), the catalyst for the alkylation reaction. The catalyst, except for the very small quantity of "makeup" to take care of the small loss of catalyst per cycle, comes back into the system from the settler drum. Hydrocarbon-to-catalyst ratio is maintained as nearly 1:1 as possible. The ratio of isobutane to olefins may range from 7-8:1 to as high as 12-15:1, depending on the availability of olefin feed stock. The

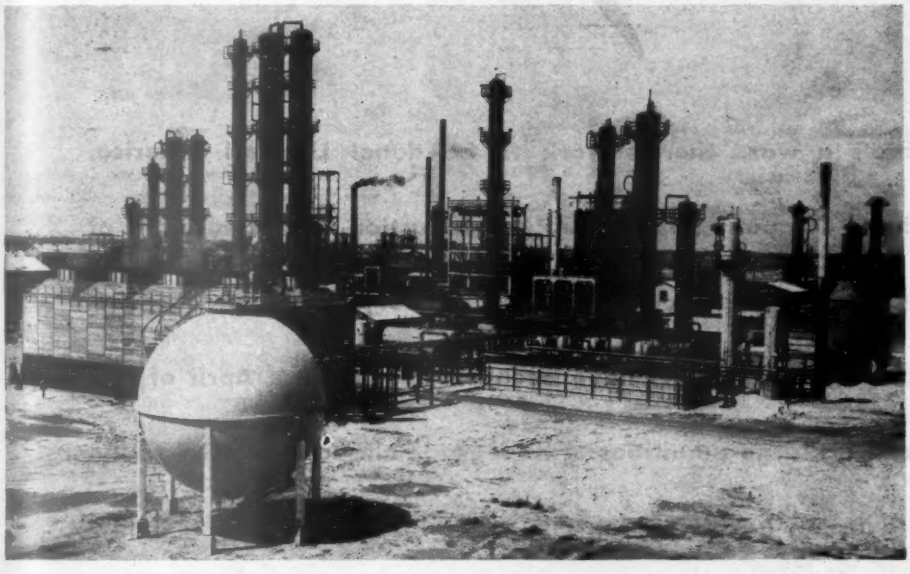
Two deisobutanizers, deisopentanizer, depropanizer, debutanizer, depentanizer, alkylate tower and secondary bauxite treater

Fractionator section at left, isomerization catalyst chamber at right and isomerization control room in foreground

Right: Boiler house in foreground, alkylation acid section and fractionator in background



Below: Alkylation, isomerization and feed-preparation units with pressure storage and water-cooling facilities in left foreground



temperature of the reaction mixture is maintained at around 90° F. without refrigeration. If it is considered of any advantage to have lower temperatures, equipment can be added to permit propane liquid to be circulated and evaporated in the reaction zone to obtain the desired temperature. One distinguishing fact exists, however, in this process, according to the operators. It is not necessary to use artificial cooling, refrigeration, with HF as catalyst to obtain high yields and low hydrocarbon losses. When using sulfuric acid, it has been stated, temperatures of 45°-50° F. are necessary to reduce losses and improve yields. Exchanger-tube bundles in the contactor (reactor) may be used for the propane cooling in case such cooling is considered desirable.

The reaction streams pass from the contactor to the catalyst settler, from which the recycle acid is removed from the bottom drawoff. The alkylate-reaction mixture goes from the top of this settler to the surge tank, thence to the azeotropic tower (or HF stripper or prefractionator) to remove the last portion of catalyst.

Trace of Fluorine Left

Bottoms from this tower are used to preheat the incoming charge to the tower. Free HF is completely removed in this tower leaving only a trace of organically-combined fluorine. The reaction mixture is passed through treater columns where it contacts bauxite to remove this organically combined fluorine. This bauxite is used until its reaction capacity is reduced beyond that which is practical and the bauxite is then discarded, mixed with lime or other neutralizer, and disposed of in any suitable manner, such as dumping in a pit. The alkylate when charged to the bauxite tower contains about 0.01-0.025 per cent combined fluorine, and passes through the tower at 180°-185° F. to have its fluorine content reduced to about 0.001 per cent by weight or less.

The reaction mixture joins the effluent from the isomerization unit and is charged to two 10-ft., 60-tray deisobutanizers operating in parallel. Reflux ratios of 3.5:1 to 5:1 are maintained, producing an overhead stream containing 80 to 90 per cent isobutane.

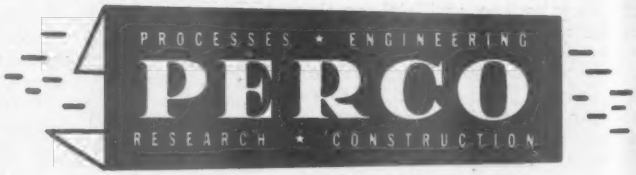
The bottoms from this deisobutanizer tower pass to another where the normal butane is taken overhead to storage, later to be charged to the isomerization unit. These bottoms now contain iso and normal pentanes, and the total alkylate which includes 2 or 3 per cent of heavy ends. Debutanizer bottoms are given a secondary bauxite treat for combined fluorine removal. The pentanes are removed in a depentanizer and refractionated in a 60-tray deisopentanizer, using about 15:1 reflux ratio, taking isopentane overhead to be stored for blending in aviation fuel; the normal pentane is returned to motor fuel.

Depentanizer tower bottoms are rerun in another tower to remove the few per cent of heavy alkylate, the overhead product being aviation alkylate, which represents about 97-98 per cent of the charge to the last tower, with an octane-number minimum of 90 and ranging up to 93 when the plant is operating under suitable conditions. The heavy ends are blended into plant motor fuel.

TO THE *Champlin* REFINING COMPANY

Congrat

WHEN there's a war, there's work to be done! Like all America, Champlin Refining Company has boosted its production more and more of war materials for air supremacy and ultimate Victory. Their new isomerization and HF alkylation plants have been on stream since April of this year manufacturing large quantities of high grade alkylate, so vital to the needs of the aviation gasoline program. It is highly satisfying to know that veteran refiners like the Champlin Company fulfill war emergency quotas by selecting Perco isomerization and Perco HF alkylation — two processes which are well adapted for competitive postwar business.

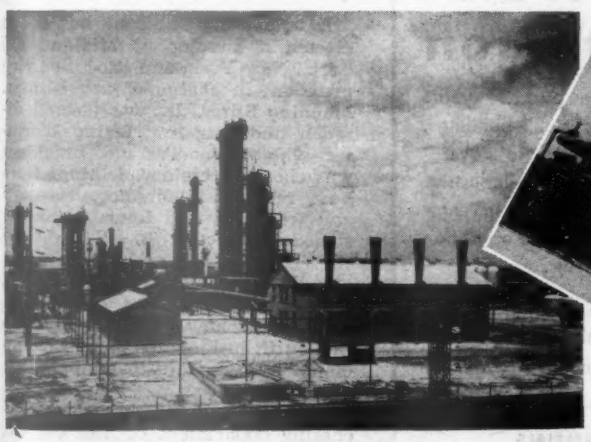


PHILLIPS PETROLEUM

nlations

PERCO

Perco engineers collaborated with those of the Champlin Refining Company, the Koch Engineering Company and others in the technical planning and initial operation of Champlin isomerization and HF alkylation plants. The isomerization unit has kept the HF alkylation plant well supplied with isobutane to maintain consistently high alkylate production.



Panorama view of Champlin isomerization and HF alkylation plants.

Fractionating columns at Champlin isomerization and HF alkylation plants.

DURING 1943 PHILLIPS UNITS PRODUCED MORE THAN TWICE AS MUCH HF ALKYLATE AS ALL OTHER HF UNITS COMBINED. SUCH PRACTICAL OPERATING EXPERIENCE IS OF UTMOST IMPORTANCE AND IS SUPPLIED TO PERCO LICENSEES. YOUR INQUIRY IS SOLICITED.

COMPANY *Bartlesville, Oklahoma*

Yields are about 1.7 bbl. of alkylate per barrel of olefin processed, a volume recovery of only about 75-78 per cent. However, the weight recovery (yield) is practically 100 per cent with the small amounts of heavy over-alkylated material being about the only loss to the aviation-fuel yield.

Acid Regeneration

The acid used as catalyst for this process is continuously purified by distillation. A small portion of the circulating HF is diverted to a primary flash tower where dissolved butanes and part of the acid are distilled overhead and returned to the settler. The remaining acid residue containing such impurities as heavy acid-soluble oils (a reaction byproduct) and water, is purified by fractionation using a flash tower having a packed leg with a reboiler at the bottom and a fractionator with three bubble-cap trays. Purified HF is the overhead product from the fractionator and is returned to the system. Impurities are taken as bottom product from the acid-oil leg.

In ordinary operation, drying of feed stocks has been so thorough that it has been unnecessary to remove water from the acid-oil leg. Acid soluble oils are produced at a rate of 0.5 to 1 per cent of the light alkylate yield.

To augment the supply of isobutane from the various sources which is insufficient to supply the unit's requirements, normal butane is segregated as outlined briefly above in a tower operated at 80-lb. pressure, coming overhead at a 135° F. top temperature. Dried over bauxite, the normal butane passes into two sets of three reactors charged with anhydrous aluminum chloride, the charge being heated to about 230°-300° F., and is mixed with a small proportion of anhydrous hydrochloric acid which acts as a catalyst promoter. Passing through the catalyst chambers in the vapor state the charge next enters a guard chamber which removes any traces of $AlCl_3$ carryover. The isomerized vapors are condensed and the HCl is stripped out in a 45-tray tower, the HCl being returned to the process. The bottoms are washed with caustic, filtered through sand to remove traces of caustic solution, then go to the deisobutanizer and are joined with the effluent from the alkylation reaction. Two towers are used here in parallel, each with 60 trays. Both the fresh and the unreacted recycle isobutane along with some propane are removed from the remainder of the material, and in the second step propane is taken out, the isobutane dried and returned to the process to be mixed with the B-A cut in the reaction zone.

Ultimate yield of isobutane in this operation is 96-99 per cent. The conversion per pass through the unit may range from about 30 per cent to more than 50 per cent, this again being determined by the reaction time and by the freshness of the catalyst. One thousand-pound charge of catalyst will normally produce more than 20,000 bbl. of isobutane.

Operation of This Unit

Champlin's aviation fuel plant started operation during April this year. The plant came on stream smoothly and has maintained designed production rate of alkylate as of the date of this writing. Stream day production is well above the design figure, in fact for considerable periods when enough charge stock has been available, aviation alkylate production has averaged as high as 175-180 per cent of design.

The successful operation of this plant by Champlin demonstrates the ability of the middle-to-small independent to produce this essential aviation fuel. Another matter of interest in this connection is the cooperation possible in the American oil industry under the urgency of war needs. In this case the efforts of Champlin Refining Co., which built and operated the plant, Winkler-Koch Engineering Co. which designed it, and Phillips Petroleum Co. which licensed the process and supplied all necessary start-up assistance have resulted in a considerable contribution to aviation fuel production.

STRUCTURAL STEELWORK
Produced by Patterson

Structural steelwork produced by Patterson the past 24 years includes the complete range of structural frames, steel buildings, bridge and industrial construction. From private industry to government war projects—from oil, mining, cotton and processing industries to air depots and airplane factories—Patterson experience in engineering, fabricating and erecting has characterized our co-operation to meet wartime emergencies and industrial requirements.

Patterson facilities, largely freed from wartime obligations, are again available for immediate and postwar construction to meet present and future requirements for bigger and better manufacturing, industrial and processing operations.

ALSO DISTRIBUTORS OF STEEL WAREHOUSE MATERIALS

- Bars
- Shapes
- Tool Steel
- Cold Drawn Steel
- Plates
- Sheets
- Rivets
- Bolts and Washers

(Largest Stocks South of St. Louis)

Designs and Quotations Submitted Without Obligation

Since 1920

PATTERSON STEEL COMPANY

TULSA, OKLAHOMA

Douglas L. Cullison has been elected a director of Midland Oil Corp., New York, and executive vice president in charge of acquisitions. **Manning Stires, Jr.,** was elected director and treasurer. **Irving Wormser,** who resigned as vice president was chosen secretary. **I. Montefiore Levy** resigned as director, secretary and treasurer, and **Louis Otten** resigned as director.

M. H. Champion, Oklahoma City, tank-car operator and oil freight-rate expert, now with a transportation outfit in England, has been promoted from captain to major.

J. H. Allen, formerly in the purchasing department of Sun Oil Co. in Tulsa, has been made assistant to **M. L. Brown,** production superintendent for the company in Oklahoma and Kansas.

Walter R. Graham has been named general manager of the McPherson, Kans., plant of National Cooperative Refinery Association. He formerly was a staff member of Midland Cooperative Wholesale, Minneapolis. He succeeds **A. E. Landsittel,** who was compelled to leave his post by ill health.

TWO-PLUG CEMENTING PROCESS

THE two-plug process is the conventional method for placing cement slurry behind the casing in a well. It is the most convenient method yet devised, provided the well is not excessively deep, the bottom-hole temperature is not unusually high and when no other unusual circumstance makes it advisable to use a more complicated method. This process derives its name from the fact that two plugs are used in the casing to separate the cement slurry from the mud fluid. These plugs act as barriers between the mud fluid and the cement slurry, and thus prevent contamination of the cement by the mud fluid. The top plug also furnishes a convenient stop for a measuring line bob used in keeping a check on the depth of the top of the slurry while pumping it into the well.

The method used in this process is pictured in Fig. 1. Assuming that the casing and annular space behind the casing are full of drilling mud at the beginning, the bottom plug A is placed in the top of the casing. The mixing operation, as described in Installment 145, is started. The cementing pump takes mixed slurry from the cementing vat and discharges through suitable connections into the top of the casing above the bottom plug. This forces the plug downward, displacing mud out from the bottom of the casing and back up through the annular space into slush pits at the surface.

After the desired amount of cement is pumped into the casing, the connections are changed and the top plug B is placed in the casing above the cement. Drilling mud is then pumped in to force the column of cement downward.

A specially constructed measuring device is used to follow the top plug and determine when the cement has reached the proper position. This device consists of a reel and counter C, a wire line D, a stuffing box and staff assembly E, and a lead bob F. Before starting the bob into the casing the counter is set on zero with the bob at the top of the pipe, at the derrick-floor level, or at any other convenient reference point. Then as the bob follows the plug, which is checked by the "feel" of the line, the counter on the measuring device gives at all times an accurate depth reading on the top of the column of cement.

When the bottom plug reaches the float collar G the collapsible washer at the top of the plug is forced down by the continued pumping and cement slurry goes through the holes in the body of the plug, thence downward out of the bottom of the pipe and back upward around the pipe moving mud fluid ahead of it and forcing more mud fluid out at the top of the well.

Pumping of mud into the casing on top of the top plug is continued until the top plug almost reaches or actually bumps the bottom plug.

The float collar is generally placed in the casing string a joint or two off bottom and controls the maximum depth to which the top plug can be pumped.

Another variation of the method consists of using a float shoe at the bottom of the casing and placing a metal disk, with a hole through the center, at the level where it is desired to stop the plugs. Still another variation, which is not quite as safe, consists of using no float collar or disk to stop the plug and depending entirely upon watching the measuring device and stopping the pumps when the top plug reaches the proper depth.

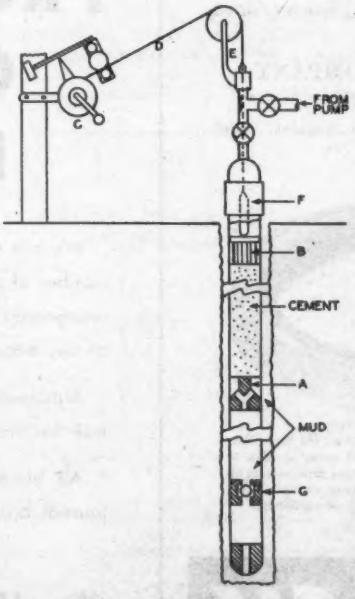


Fig. 1: Diagram of two-plug method

In present-day practice the bottom plug is seldom used, since experience has indicated that it aids but little, if any, in reducing the mixing between the first slurry and the drilling mud. Anyway, the plug could have no control over mixing that occurs after the slurry passes out of the bottom of the pipe; and, too, the contaminated portion of cement in its final position at the top of the cement column is not particularly objectionable since great strength and solidity are not so important at that point.

It is desirable to leave approximately 10 ft. of cement in the casing for every 1,000 ft. of depth. For example, about 30 ft. should be left in a 3,000-ft. string, or 60 ft. in a 6,000-ft. string. This is advisable because of a certain amount of contamination at the upper end of the cement column. Pure, solid cement is very desirable right at the bottom of the casing. Therefore, the contaminated portion should be left inside the pipe and later drilled out.

After the plug has reached its proper position, the measuring line and bob are withdrawn from the well, the valve at the top of the well is closed and left undisturbed until the cement has set. After some 36 hours or more of setting, the cement and drillable plugs may be drilled out of the inside of the casing.

It is usually best practice, particularly in a new area, to run a subsurface temperature survey following the cement job, in order to locate and record the actual top of the cement in the annulus.*

*See Installment 96.

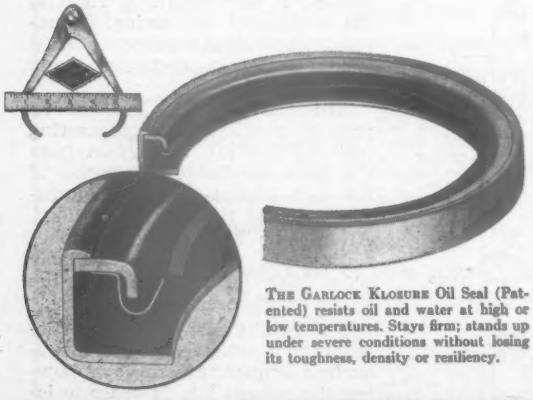
Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

On Every Front

GARLOCK Packings, Gaskets and KLOZURE Oil Seals are helping to keep production running at top speed in war plants and essential civilian industries on the home front. Also they are giving dependable service on our many battle fronts—on warships, landing barges, tanks, bombers and fighter planes—for a quicker end to this war of aggression.

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

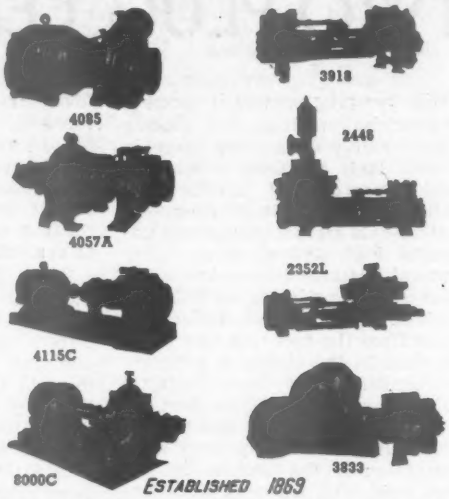
Tulsa, Okla. Houston, Texas Los Angeles, Calif.



THE GARLOCK KLOZURE Oil Seal (Patented) resists oil and water at high or low temperatures. Stays firm; stands up under severe conditions without losing its toughness, density or resiliency.

GARLOCK

PUMPS
CENTRIFUGAL
RECIPROCATING



ESTABLISHED 1869

DEAN BROTHERS PUMPS INC.
INDIANAPOLIS IND.
323 W TENTH ST.

PRODUCTION CROWN BLOCKS

We can make immediate delivery of a limited number of production crown blocks with *genuine manganese* steel casing, crown and sand sheaves of any beam and sheave combination.

Anticipate your requirements and enter orders *now* for this critical manganese material.

All blocks equipped with Lucey chain-oiling journal boxes.

LUCEY PRODUCTS CORPORATION
OIL WELL SUPPLIES
TULSA, OKLAHOMA

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Stabilization and Gas Recovery

A "sure fire" method of eliminating evaporation losses is the somewhat expensive process known as crude-oil stabilization. This involves deliberately causing the evaporation of the gaseous parts of the crude oil but in such equipment that the valuable vapors can be saved and the fuel-gas part can be burned. Field vapor losses not only decrease the volume of crude oil that can be sold but they also lower the A.P.I. gravity of the oil by 1 to 2 points so that the crude may sell at a lower price. The exact losses are obviously dependent upon local conditions and kind of oil, but if protective measures are not taken the losses may be as large as those estimated for 1920-1921 by Schmidt of the Bureau of Mines (Bull. 379, 1934)—

Source of loss	Ave. per cent evaporated
Flow tanks	1.0
Filling lease tanks	1.0
Lease storage	1.5
Gathering systems	1.0
Transportation	1.0
Tank farms	0.7
Total	6.2

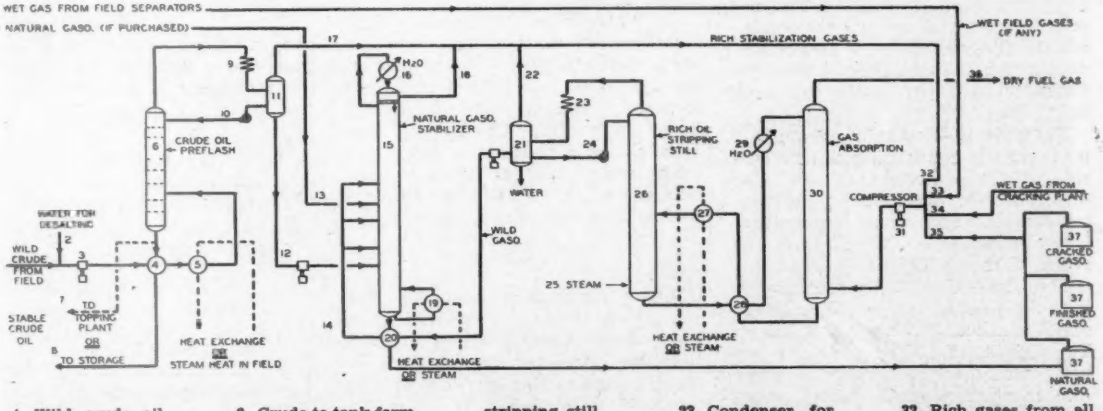
Some refiners remove natural gasoline and stabilize the crude oil as it enters the tank farm or refinery and thus eliminate all handling losses except those involved in (1) finished gasoline storage, (2) the cracking plant, and (3) natural gasoline storage.

Stabilization.—The operation of removing gas-like components (stabilization) can be practiced on all volatile stocks of a refinery in a single stabilization and vapor recovery plant. Among the materials that may need stabilization are: (1) Crude oil—eliminates losses in much of refinery. Needed particularly if natural gasoline is mixed in crude; (2) wild natural gasoline from vapor-recovery system; (3) straightrun gasoline; (4) cracked gasoline, and (5) some purchased natural gasoline is unstable.

In addition all refinery or field gases should be collected into an absorption and stripping system for complete recovery of gasoline components.

The flow diagram shows wild crude oil being preheated and flashed at 25-40 lb. producing a wet gas which goes to the gas-recovery system, a light or wild gasoline which goes to a stabilizer, and stable crude oil which goes to storage or directly to the salt settlers of the refinery. The gasoline stabilizer may be used for any volatile liquids from the refinery, and in some plants the entire gasoline is sent through the stabilizer (called a debutanizer). The absorber and stripper operates on any rich gases, such as those from: (1) Crude-oil preflash or topping-still tail gases; (2) cracking-still gases; (3) wet field gas (if available); (4) finished gasoline storage; (5) natural gasoline storage, (6) solvent plants employing propane, butane, or light naphtha.

The system shown on this page is more elaborate than required for most situations. Each refinery has its own processing scheme, particularly older plants, and hence some of the operations indicated may be unnecessary and part of the equipment may already be available. If a gasoline plant is available, field stabilization of crude amounts to nothing more than the crude oil preflash system shown at left in diagram.



1. Wild crude oil
2. Water for desalting
3. Crude pump
4. Crude to crude exchanger
5. Heat from refinery or steam if in field
6. Small bubble tower
7. Crude to refinery without exchange
8. Crude to tank farm
9. Condenser for wild gasoline
10. Preflash reflux
11. Gas separator
12. Wild gasoline from crude oil
13. Unstable natural gasoline if needed
14. Wild gasoline from stripping still
15. High-pressure stabilizer
16. Reflux condenser
17. Rich gas from crude
18. Rich stabilizer gas
19. Reboiler exchanger
20. Heat exchanger
21. Gas separator
22. Rich stripper gas
23. Condenser for steam and gasoline
24. Stripper reflux
25. Stripping steam
26. Stripping still
27. Rich oil heater
28. Heat exchange
29. Lean oil cooler
30. Gas absorber
31. Gas compressors
32. Rich gases from all points
33. Field gases from separators
34. Cracking still gases
35. Tank gases
36. Dry gas to fuel system
37. Vapor recovery from storage

No. 3 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

PRACTICAL REFINERY ENGINEERING

No. 7—Heat Transfer Film Coefficients—Steam Condensing on Outside of Horizontal Tubes

by Paul Buthod and B. W. Whiteley

DATA concerning film resistances of condensing vapors are rather inadequate. If the condensing vapor consists of only one component on the outside of horizontal tubes, the heat-transfer film coefficient on the vapor side can be obtained from the expression derived by Nusselt:

$$(1) \qquad h = 0.725 \left(\frac{k^3 \rho^2 g \lambda}{d z t_s}\right)^{0.25}$$

Unfortunately many condensing operations in refinery practice involve a mixture of vapors, and film coefficients for such conditions cannot be predicted with any degree of accuracy at the present time. The thermal properties of the fluid in Equation 1 are to be evaluated at the mean film temperature of the fluid. Since the film temperature cannot be measured practically, it is necessary to assume a value for the temperature drop through the steam film and solve for the thermal film resistance by trial-and-error methods. Ordinarily, two or three trials are sufficient for obtaining the correct answer.

The trial-and-error solution can be made rapidly by using the accompanying chart (Fig. 1). The use of this chart and method for obtaining the film resistance of steam condensing on the outside of horizontal tubes is illustrated by the following examples.

Example 1.—Saturated steam at 5 p.s.i. gage is condensing on the outside of a 2-in. horizontal tube. The difference between the pipe wall temperature and steam temperature is estimated to be 40° F. Find the steam film coefficient.

Solution.—Using the accompanying chart—start at 40° F. on the scale marked "Temperature Drop Through Steam Film" and move horizontally to the steam-pressure line marked "5 p.s.i. gage." From this point drop vertically to the "pipe outside diameter" inches line for 2-in. diameter. Moving horizontally to the left scale, the thermal resistance is found to be:

$$R = 0.00066$$

The film coefficient is:

$$h = 1/R = 1/0.00066 = 1515$$

By means of the chart accompanying this article the solution of problems concerning film coefficients of condensing steam may be rapidly obtained. The solution of two practical problems demonstrates how the chart is to be used.

Example 2.—Water is to be heated from 80° F. to 150° F. A standard tube bank is available for use. This bank of tubes consists of fifty ⅝-in. 16-gage brass tubes having a length of 4 ft. Water is to be pumped through the tubes and saturated steam at 10 p.s.i. gage is to be condensed on the outside of the horizontal tubes. How many sections of the standard tube bank, in series, will be required to heat 10,000 gal./hr. of water.

Solution.—The total resistance to the flow of heat consists of the water film resistance, metal wall resistance, and steam film resistance. These will be determined in the above order.

(a) Water film resistance.—Calculating the mass velocity on the water side: 10,000/50 = 200 gal./hr. through each tube. This is equivalent to a mass velocity of 1,250,000 lb./hr.-sq. ft. (See The Oil and Gas Journal, July 1, 1944, p. 50.)

The water is at an average temperature of 115° F. and the film resistance is determined to be

$$R = 0.00065$$

When condensing steam is the heating medium, it is convenient to base all resistances on an equivalent resistance on the steam side (in this case, the outside of the tube).

$$R_1 = R \times D_o/D_i$$

$$= 0.00065 \times 0.625/0.495 = 0.000854$$

(b) Metal wall resistance.—The resistance of the metal wall is R = 0.00007. (See The Oil and Gas Journal, June 17, 1944, p. 99.) Correcting this to the outside diameter:

$$R_2 = R \times 2 D_o/(D_i + D_o)$$

$$= 0.00007 \times 1.25/1.120 = 0.000078$$

(c) Steam film resistance.—The method for obtaining the steam film resistance involves a trial-and-error calculation of the temperature drop through the steam film. A value of the temperature drop through the steam film is assumed and the corresponding film resistance is read from the accompanying chart. The temperature drop which would be obtained with this resistance on the steam side is calculated from the following equation:

$$t_s = \Delta t \times R_s/(R_1 + R_2 + R_s)$$

If the calculated value of t_s in this equation checks the assumed value, the initial assumption was correct. The true mean temperature difference is: Δt = 122° F. (See The Oil and Gas Journal, June 24, 1944, p. 84.)

The sum of the water side and metal wall resistance is:

$$R_1 + R_2 = 0.000854 + 0.000078$$

$$= 0.000932$$

Trial 1.—Estimate t_s = 50° F.

Using t_s = 50° F. on the accompanying chart with steam at 10 p.s.i. gage and a 0.625-in. diameter tube, the resistance is found to be

$$R_s = 0.00054$$

Check:

$$t_s = \frac{122 \times 0.00054}{(0.000932 + 0.00054)} = 45° \text{ F.}$$

Trial 2.—Estimate t_s = 45° F.

R_s = 0.00051 (from accompanying chart)

Check:

$$t_s = \frac{122 \times 0.00051}{(0.000932 + 0.00051)} = 43° \text{ F.}$$

Trial 3.—Estimate t_s = 43° F.

R_s = 0.00050 (from accompanying chart)

Check:

$$t_s = \frac{122 \times 0.00050}{(0.000932 + 0.00050)} = 43° \text{ F.}$$

Since the value of 43° F. checks

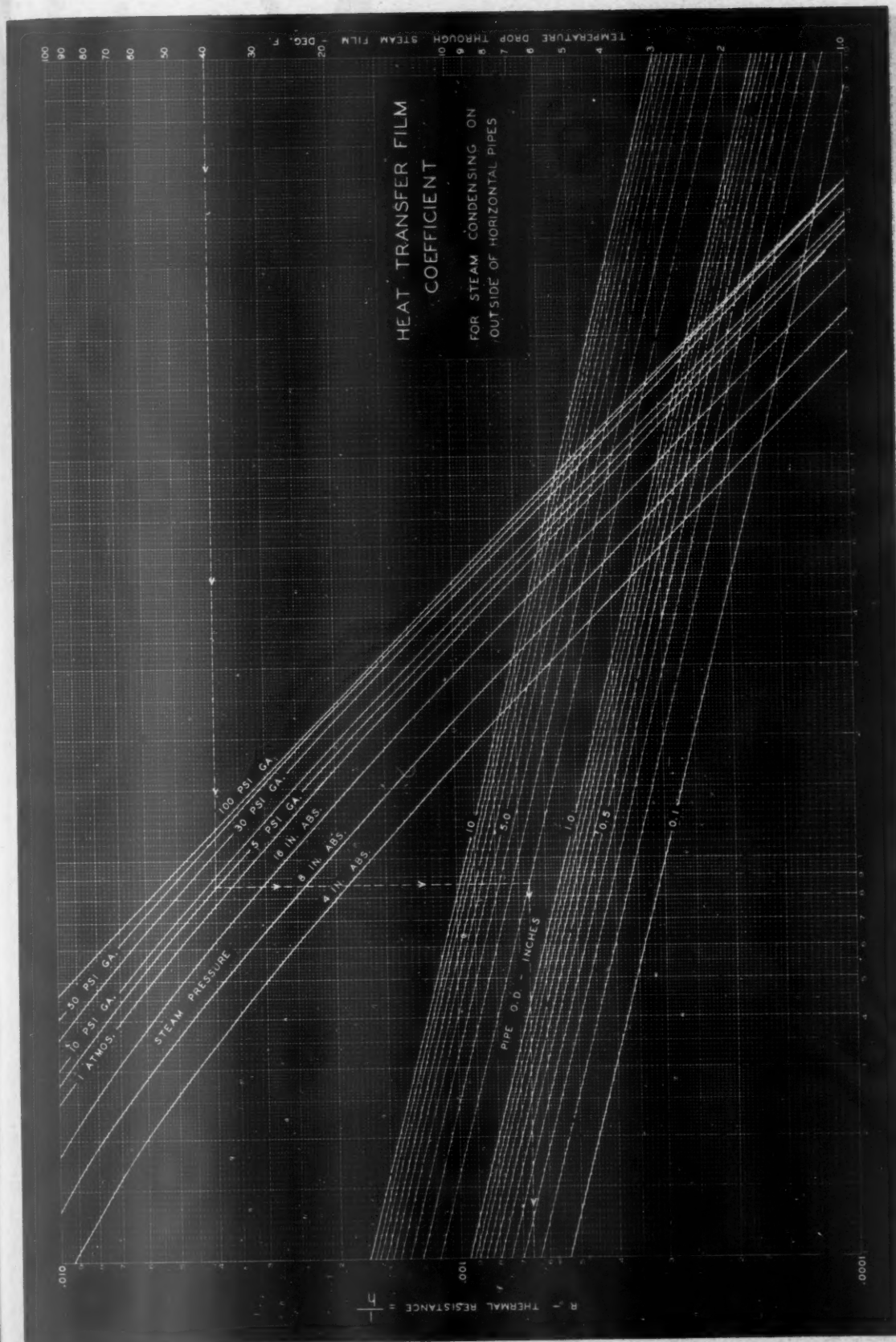
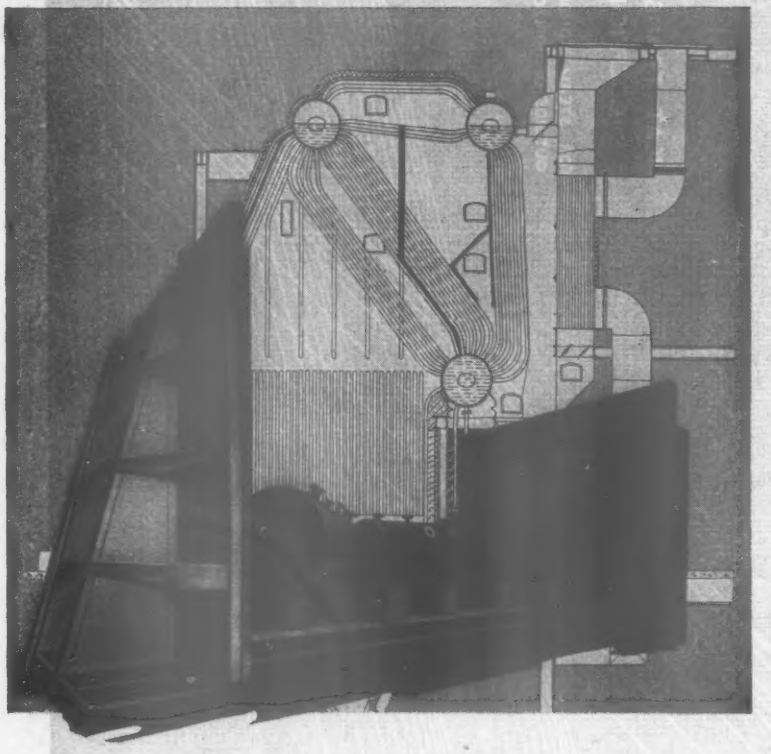

HEAT TRANSFER FILM COEFFICIENT
FOR STEAM CONDENSING ON OUTSIDE OF HORIZONTAL PIPES
TEMPERATURE DROP THROUGH STEAM FILM - DEG. F.
R = THERMAL RESISTANCE = 1/h
STEAM PRESSURE
50 PSI GA.
30 PSI GA.
15 PSI GA.
1 ATMOS.
16 IN. ABS.
8 IN. ABS.
4 IN. ABS.
PIPE O.D. - INCHES
10
5.0
1.0
0.5
0.1

Fig. 1

UNION



ALL UNION WELDED VESSELS are stress relieved in this large zone controlled furnace. Gas fuel under six point potentiometer automatic control provides uniform temperature throughout this special furnace. The use of gas assures a neutral atmosphere within the furnace and prevents oxidation and scaling of the charge. Union, strategically located, is equipped to build to your exacting specifications. Write for booklet that describes our facilities. Send us your inquiry.

UNION IRON WORKS
ERIE • PENNSYLVANIA

PRESSURE VESSELS
STEAM GENERATING EQUIPMENT

with the assumed value, the resistance obtained by using a temperature drop of 43° F. through the steam film is correct. The total resistance based on the outside area of the tubes is the sum of the separate resistance or:

$$R_i + R_o + R_w = R_t = 0.00143$$

$$U = 1/R_t = 700$$

The amount of heat transferred is obtained from a heat balance covering the pounds of water handled and the temperature rise:

$$q = 10{,}000 \times 8.33 \times 70 = 5{,}830{,}000 \text{ B.t.u./hr.}$$

The required surface area for heat exchange is:

$$A = \frac{q}{U\,\Delta t} = \frac{5{,}830{,}000}{700 \times 122} = 68.3 \text{ sq. ft.}$$

The surface area of one unit is:

$$4 \times 50 \times 0.1632 = 32.72 \text{ sq. ft.}$$

The required number of units will be:

$$68.3/32.7 = 2.1$$

Three units in series will be necessary and this number should allow ample reserve capacity to take care of any fouling conditions.

Notation:

cu. ft.

q = amount of heat transferred, B.t.u./hr.

A = area of heat exchange surface, sq. ft.

Δt = true mean temperature difference, °F.

t_s = temperature drop through steam film, °F.

U = over-all coefficient of heat transfer, B.t.u./hr.-sq. ft.-°F.

h = heat transfer film coefficient, B.t.u./hr.-sq. ft.-°F.

R_i, R_o, R_w, etc. = thermal resistance, = 1/h

k = thermal conductivity, B.t.u./hr.-ft.-°F.

g = acceleration of gravity, ft./hr. ($= 4.18 \times 10^8$)

z = viscosity of condensate, lb./ft.-hr.

d = pipe diameter, ft.

D_o = outside pipe diameter, in.

D_i = inside pipe diameter, in.

λ = latent heat of vaporization, B.t.u./lb.

ρ = density of condensate, lb./cu. ft.

References and Bibliography

1. Badger, W. L., and McCabe, W. L., "Elements of Chemical Engineering," McGraw-Hill Book Co., New York, 1936.

2. McAdams, W. H., "Heat Transmission," McGraw-Hill Book Co., New York, 1933.

Natural Gas

Gas Allowables Assigned Northern Natural Wells

TOPEKA.—The Kansas Corporation Commission has granted the application of Northern Natural Gas Co. to have gas allowables assigned to 11 projected wells in Stevens County and 1 in Finney County, following their completion. The commission found that a ready and available market exists for gas produced from the proposed wells and that the drilling of these tests is necessary to meet the market demand.

Pennsylvania-New York Area to Get More Gas

WASHINGTON. — About 15,000,000 cu. ft. more of natural gas will be delivered to the northern Pennsylvania and western New York area daily, following the action of Federal Power Commission in authorizing four subsidiaries of Columbia Gas & Electric Corp. to build facilities costing approximately $1,927,000. Gas will be piped to communities and war industries which otherwise would have an inadequate supply because of the decline in production from local fields.

The four companies receiving permits are Manufacturers Light & Heat Co., Manufacturers Gas Co., United Fuel Gas Co., and Home Gas Co.

Proration Orders Issued For Kansas Gas Fields

TOPEKA.—The Hugoton field was allotted 6,685,228,000 cu. ft. of gas for July in proration orders issued by the state Corporation Commission for the Hugoton, Otis and Cunningham fields. This order extends from April 1 to September 30, 1944. During the past month, seven new wells were completed in Hugoton and 10 retests were made.

The order gave the Cunningham field of Kingman and Pratt counties 627,000,000 cu. ft. of gas for July. Principal buyers in the field are Kansas Power & Light Co. and Skelly Oil Co.

The Otis field of Rush and Barton counties was authorized to produce 1,327,552,000 cu. ft. Principal buyers in this pool are Central Gas Utilities, Kansas-Nebraska Natural Gas Co., Kansas Power & Light Co., Kenwood Oil Co., Northern Natural Gas Co. and Producers Gas Co.

Willien Takes New Post at Institute of Technology

CHICAGO.—Leon J. Willien, nationally known gas expert, has been appointed associate director of Institute of Gas Technology at Illinois Institute of Technology. He was a gas engineer for Public Utility Engineering & Service Corp., Chicago, and he is head consultant on manufactured gas for War Production Board. In his new position he will have charge of research in gasification and related fields, and he will serve as consultant on water-gas generation.

Willien received the Beal Medal for the most valuable technical paper read before American Gas Association's technical section at the 1927 convention. In 1936 he received the Charles A. Monroe Award from the association for his contributions to the manufacture, mixing and transmission of gas. He was elected an honorary member for life of Pacific Coast Gas Association, for making "the most valuable contribution in 1932 to the gas industry on the Pacific Coast."

Revision of Hugoton Pool Order Recommended

OKLAHOMA CITY. — Walker T. Pound, chief conservation officer, has recommended revision of the state Corporation Commission's order on the Hugoton gas pool of Texas County, and the commission has taken testimony under advisement. Pound recommended that fractions of sections along the Oklahoma-Kansas state line be added to the adjacent full 640-acre sections on the Oklahoma side and that allowables of gas wells be based on the total acreage. Allowable units would be limited to 800 acres. (The present order provides for full allowable to 640-acre units, with adjusted allowables for units of less than 640 acres.)

In cases where operators or leaseholders are unable to communitize the full 640-acre unit within the governmental surveys of a section. Pound recommended that adjacent additional acreage of other sections be included in the unit.

Similar revisions have been recommended for the order issued by the Kansas Corporation Commission covering the seven-section portion of the Hugoton field on the Kansas side of the line.

Survey Reveals Rapid Drop In Bottom-Hole Pressure

OKLAHOMA CITY. — Swift decline in bottom-hole pressure and waste of natural gas in the Pennsylvania sand zone of the Pauls Valley field, Garvin County, Oklahoma, are revealed in a survey made by the state Conservation Department under the supervision of Tom Bailey, petroleum engineer. An average gas-oil ratio of 2,443 is disclosed by the survey, which used 46 wells in the study. The ratios range from 424 to 9,753 ft. Production of the 46 wells was 7,369 bbl. of oil and 18,000,000 ft. of gas per day.

Although some of the wells have pipe-line connections for sale of the natural gas, most of the gas is popped into the air.

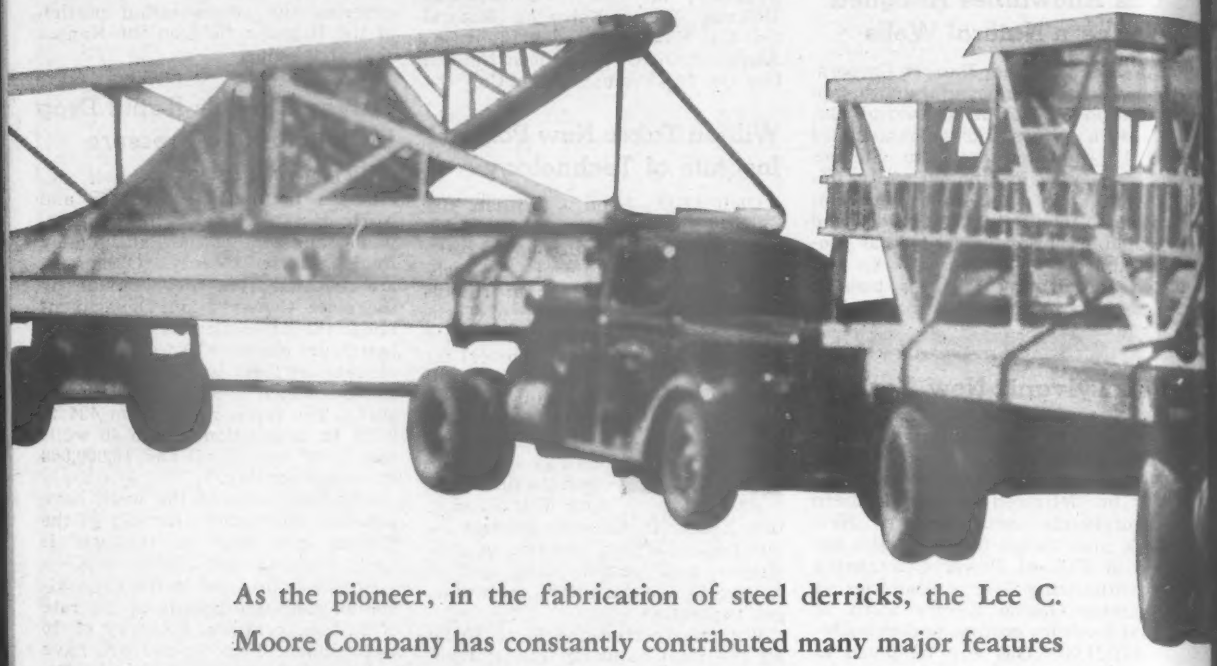
Reservoir pressure in the Pennsylvanian zone is dropping at the rate of 2.51 lb. per day, a survey of 16 wells shows. Periodic surveys have been made in the field, the last being completed as of July 17 and the previous survey being on April 17, an interval of 91 days. During this period the decline was 228.84 lb.

Recycling

Shell Building New Cycling Plant at Sheridan, Tex.

HOUSTON. — Shell Oil Co., Inc., has started construction of a cycling plant near Sheridan, Colorado County. The plant, with initial daily capacity of 100,000,000 cu. ft. of gas, is expected to be completed in the spring of 1945. The Sheridan area is a Wilcox field, with production coming from zones about 10,000 ft. deep. Plans look to daily output of around 6,000 bbl. of war products, including isobutane, normal butane, isopentane, normal pentane, natural gasoline and condensate. Sixty-four-hundred horsepower will be used in the engine room for recompression purposes.

Moore MASTS



As the pioneer, in the fabrication of steel derricks, the Lee C. Moore Company has constantly contributed many major features to *drilling rig modernization.*

The MOORE JACKKNIFE CANTILEVER DRILLING MAST as an example, is highly portable (two or three trailer trucks will transport it, depending on size) — mast is complete in every detail — has conventional derrick capacities and accommodates any standard unitized draw-works, rotary and power.

Many drilling contractors and operators have already learned of the advantages of MOORE MASTS in transportation, erection, rigging-up and dismantling.

Become acquainted with the superior performance of MOORE JACKKNIFE CANTILEVER DRILLING MASTS.

LEE C. MOORE & COMPANY
INCORPORATED
PITTSBURGH OKLA. U.S.A.

You're "Safe"
WHEN YOU CARRY
90-UL
ECOLITE

Don't Wait—Get this new Safety Lantern with BROKEN BULB EJECTOR!

SAFE
IN HAZARDOUS PLACES

Tested and Recommended by Underwriters' Laboratories.

- Sealed beam construction.
- Throws bright beam 1500 ft.
- Large handle and pivoting feature gives you light where you need it and both hands free for work. Now at jobber and supply stores.

Ecolite No. 90-UL

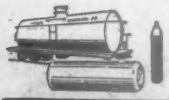
ECONOMY ELECTRIC LANTERN COMPANY
3100 W. Cherry St. Milwaukee 8, Wis.

For that
PETROLEUM CHEMISTRY
Problem!

LIQUID Methyl Chloride BY ANSUL*
LIQUID Sulfur Dioxide BY ANSUL*

If you're faced with problems concerning Catalyst Solvents, Refining Agents, Extractants, Dewaxing Agents or Reaction Solvents, the answer may lie in the correct application of ANSUL SULFUR DIOXIDE or ANSUL METHYL CHLORIDE.

*REG. U.S. PAT. OFF.



Easily handled. 99.9+% (by weight) pure. Available in cylinders, ton drums and tank cars.

ANSUL CHEMICAL CO.
MARINETTE, WISCONSIN
EASTERN OFFICE • PAOLI, PA.

REFINING

May Demand for Lube Oil Sets New 7-Month High

WASHINGTON.—Demand for lubricating oil in May exceeded that for April by 418,000 bbl. and was the highest recorded in 7 months, according to figures released by U. S. Bureau of Mines. This was a gain of approximately 1 per cent over the demand in May 1943. Motor-fuel demand was about 17 per cent greater than in May 1943.

Total demand for lubricating oil, domestic and export, in May is estimated at 3,634,000 bbl., against 3,216,000 bbl. in April, and 3,600,000 bbl. in May 1943.

Official lubricating-oil figures are not available. The estimates given are based on calculations from available production and stock figures. (Stocks were reduced by 297,000 bbl. in May.)

Production of lubricating oil in May totaled 3,337,000 bbl., against 3,273,000 bbl. in April, and 3,281,000 bbl. in May 1943.

Stocks May 31 totaled 7,771,000 bbl., against 8,068,000 bbl. April 30, and 9,156,000 bbl. May 31, 1943.

Destination Pricing System Predicted for August

WASHINGTON. — Announcement of a delivered-to-destination pricing system for oil products may be expected by tank-wagon sellers and tank-car consumers early in August, officials of Office of Price Administration said last week. Oil-industry representatives who conferred with OPA approved for the most part the new prices for tank-wagon resellers, and OPA will continue to work on the tank-car prices to consumers. Although the new system will not reverse the Leventhal decision which permits pricing on an Oklahoma basis only if the product actually originated in Oklahoma, it will extend the same system of pricing that exists in Oklahoma.

A specific formula, which amounts to taking a certain number and adding the freight factor to get a delivered price, has been worked out for each delivery point in the Middle West. The prices will apply in the areas in which Standard Oil Co. of Indiana is the reference seller. The region includes most of District 2 except Ohio and Kentucky. The new formula pricing method will replace the present last-sale principle of pricing.

OPA is still studying some of the mechanics of its expected price reduction on housebrand gasoline, following the PAW cut in the octane count from 72 to 70. A general reduction in gasoline prices may come about eventually as a result of the quality cut, but officials said this will not be given immediate attention. The present proposal provides for a reduction of about ⅛ cent a gallon in refinery prices, with jobber and dealer ceilings untouched.

Atlantic Refining Co. Completes Cat Cracker

PHILADELPHIA. — A substantial increase in the national output of aviation gasoline was assured as completion was announced last week by the Atlantic Refining Co. of a newly-constructed fluid-catalyst cracking plant at its Point Breeze refinery here.

A similar cracking unit, now being built at the company's refinery at Port Arthur, Tex., will also be completed within a few days. When this plant is ready for production it will mark the end of Atlantic's construction program of aviation gasoline equipment, begun early in the war period, in which the company has invested more than $22,000,000.

Many of the production difficulties normally encountered in the starting up of such a huge unit may be eliminated, here and at Port Arthur, as the result of continuous tests conducted since last year in a pilot unit installed at Point Breeze to reproduce in small scale the operating conditions of the big cracking plants.

The entire structure of the cracking unit is welded and it is believed to be the largest welded structure in existence involving steel sections of such weight.

An idea of the magnitude of the unit is conveyed by these facts:

The catalyst regenerator weighs more than 1,000 tons under operating conditions and its base is 130 ft. above ground.

There are about 50 miles of pipe in the unit, the largest being 82 in. in diameter.

The weight of structural steel re-

quired to support the refining units totals 1,700 tons, and the total weight of plate steel in the refining units is approximately 1,400 tons.

The largest of the 13,750 valves in the unit weighs about 9 tons.

The water requirements for cooling and condensing are equivalent to the requirements of a city the size of Scranton, Pa., and the power requirements equal to that of a city the size of Pottstown, Pa.

The heat required in the unit would be sufficient to heat 20 large office buildings.

More than 5,000 drawings were prepared specifically for the construction job, and nearly 1,000,000 sq. ft. of blueprint paper was used.

PAW and OPA Adopt New Plan for Fuel-Oil Program

WASHINGTON. — Petroleum Administration for War and Office of Price Administration have announced a new plan for administering the civilian fuel-oil program. It is expected that their action, which was effected by amending two formal orders, will expedite the fuel oil for a heating year.

OPA will continue to have exclusive jurisdiction over the issuance of rations. In addition, OPA will process requests for reinstallations of heating equipment to use fuel oil in residences of less than four-family capacity and applications for fuel oil for space heating in other structures using less than 10,000 gal. of fuel oil for a heating year. OPA also will have sole jurisdiction over the use of fuel oil burning space heaters.

PAW will continue to make final determinations regarding installations of new oil-burning equipment in any structure. PAW will process requests for authority to reconvert equipment to use fuel oil in buildings housing four families or more and in other buildings, where consumption of fuel oil is 10,000 gal. or more for a heating year.

All applications for use of fuel oil in new and reinstalled oil-burning facilities for agricultural, commercial and industrial processing will be handled by PAW. Appeals for the use of fuel oil in new and reinstalled oil-burning facilities will be granted only if the applicant shows that the use of a solid fuel would be unreasonable.

Sun Abandons Its Policy of Single-Grade Gasoline

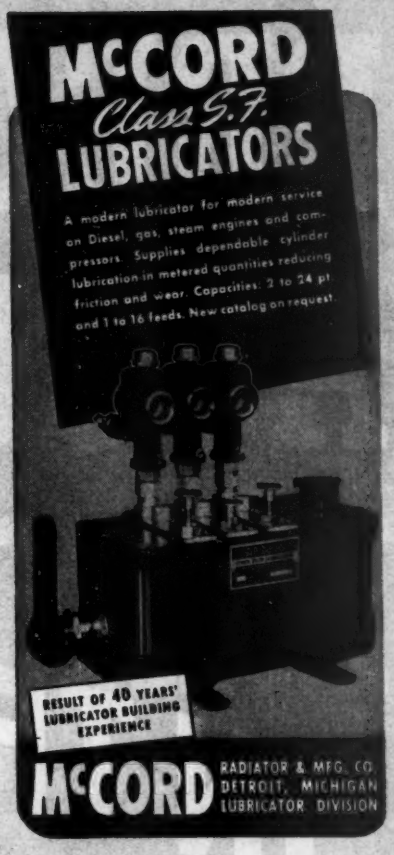
PHILADELPHIA. — Sun Oil Co., leading exponent of the policy of marketing only one grade of gasoline, announced last week that it had arranged to sell a premium motor fuel in addition to its regular grade. In a letter to Sun dealers S. B. Eckert, vice president, pointed out that Petroleum Administration for War had ordered all housebrand gasoline reduced to 70 octane because more tetraethyl lead is needed for aviation gasoline. He said some cars may not perform satisfactorily on such gasoline, with the result that some customers may switch to premium brands, costing Sun dealers business if these customers must go elsewhere.

Eckert said since Sun's aim was to meet competition in any community, the management has obtained PAW authority to market a premium fuel. He said connections joining dealers' tanks will be broken soon and immediately thereafter both gasolines would be delivered to dealers' stations.

Since no company can meet every consumer demand for premium gasoline, the letter suggested Sun dealers establish a premium and regular gasoline rationing of their own, such as 1 gal. of premium and two of regular to "A" coupon holders, and one and four respectively for "B" and "C."

LET ME SHOW YOU WHAT GOOD WATER CONDITIONING SERVICE REALLY IS!
Call JOHN FIELD-MAN ON YOUR NEXT WATER CONDITIONING JOB
LELAND HAMNER CO.
LELAND HAMNER CO.
P.O. Box 1063 · Capitol 9758 · Long Distance LD 2175
2211 PRESTON AVE. HOUSTON, TEXAS

William M. Barret, Inc.
Consulting Geophysicists
Specializing in Magnetic Surveys
Contracts accepted for domestic and foreign projects, using the most improved instrumental and interpretative technique.
GIDDENS-LANE BUILDING
SHREVEPORT, LA.


McCORD
Class S.F.
LUBRICATORS
A modern lubricator for modern service on Diesel, gas, steam engines and compressors. Supplies dependable cylinder lubrication in metered quantities reducing friction and wear. Capacities: 2 to 24 pt. and 1 to 16 feeds. New catalog on request
RESULT OF 40 YEARS' LUBRICATOR BUILDING EXPERIENCE
McCORD
RADIATOR & MFG. CO.
DETROIT, MICHIGAN
LUBRICATOR DIVISION

OIL and GAS BURNING EQUIPMENT
NATIONAL AIROIL BURNERS
1236 E. Sedgley Ave.
PHILADELPHIA 34, PENNA.

GUNITE METHOD
SAND AND CEMENT
"Placed by Air"
WRITE — PHONE — WIRE
FOR SERVICE — INFORMATION
GUNITE CONCRETE & CONSTRUCTION COMPANY
1301 Woodswether Road, Kansas City 6, Mo.
Distr. Br. Office: 228 N. LA SALLE, CHICAGO • *Branch Offices:* ST. LOUIS, DENVER, NEW ORLEANS, DALLAS, HOUSTON
"GUNITE" CONCRETE SINCE 1915

PRECISION
ACCURACY
EXACTNESS

IN THE GROOVE!

SPANG test-proves every thread on every piece of SPANG PIPE!

WHEN you're headed for oil, and every minute counts, you can't afford to be stalled by pipe thread troubles. Specify Spang to assure quick, clean threading and spinning; fast, smooth breaking of joints; and steady, uninterrupted drilling between these two operations. For Spang has hundreds of thousands of dollars invested in pipe thread precision safeguards . . . machinery, equipment, and scientific testing devices that take out all the bugs *before the pipe is delivered to you!* For instance, by means of projected light in a special instrument, thread contours can be magnified 200 times and will show the slightest deviation from the perfect thread. We do it right so it won't go wrong when it's working for you! Specify Spang for service!

SPANG-CHALFANT

Division of The National Supply Co.

Executive Offices: Pittsburgh, Pa.

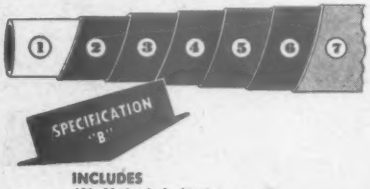
Sales Offices: Atlanta; Boston; Chicago; Denver; Houston; Los Angeles; New York; Philadelphia; Pittsburgh; St. Louis; San Francisco; Tulsa; Washington.

PIPE COATING AND WRAPPING SPECIFICATIONS

Easy as A-B-SEE!

To simplify ordering pipe coating and wrapping, Pipe Line Service Corporation offers you the easiest specifications you could ask for. You indicate either "Specification A" or "Specification B" together with the coating material desired and PLS does the rest. When you consider that you can get any type of protection you want, it's just good business to let Pipe Line Service assume the complete responsibility for the finished job.

INCLUDES
(1) Mechanical cleaning.
*(2) Mechanical priming with desired primer.
(3) Hot application of desired coating.
(4) Hot application of desired coating.
(5) One spiral wrapping of desired wrapping material.
(6) One spiral wrapping of heavy kraft paper.



INCLUDES
(1) Mechanical cleaning.
*(2) Mechanical priming with desired primer.
(3) Hot application of desired coating.
(4) Hot application of desired coating.
(5) One spiral wrapping of desired wrapping material.
(6) Hot application of desired coating.
(7) One spiral wrapping of heavy kraft paper.

PROTECTIVE COATING MATERIALS AVAILABLE ON ABOVE SPECIFICATIONS

Asphalts
Barrett Millwrap Enamel
Barrett Pipe Line Enamel
Barrett Waterworks Enamel
Bitumastic Regular Enamel
Bitumastic 70-B Enamel
Bitumastic XXH Enamel
Ennjay Enamel
No-Ox-Id
Reilly Filled Pitch Enamel
Reilly No. 230 Enamel

*Primer not required with No-Ox-Id coatings.

PIPE LINE SERVICE CORPORATION
PIONEERS IN STEEL PIPE PROTECTION
General Office and Plant—FRANKLIN PARK, ILL.
Plants at—GLENWILLARD, PA.
LONGVIEW, TEX. • CORPUS CHRISTI, TEX.

PIPE LINES

Oklahoma Pipe Line Co. Starting Three Projects

Oklahoma Pipe Line Co. soon will begin construction work on two pipe-line projects in Mississippi, expanding its operations in the Cranfield and Heidelberg fields.

The projects call for the construction of 17 miles of 8-in. line from the Cranfield pool to Gibson Landing on the Mississippi River, and 3 miles of additional gathering lines in the Heidelberg pool.

Oil handled by Oklahoma Pipe Line to Gibson Landing will be delivered to river barges. Currently the company is gathering from six wells in the Cranfield pool, which is in the stage of early development.

In the Heidelberg pool, the Oklahoma Pipe Line Co. already has 5 miles of gathering lines serving 16 wells, and operates 2 miles of main line which delivers oil to a loading rack at the town of Heidelberg.

Oklahoma Pipe Line started operating in Mississippi in September 1943, gathering and handling oil produced from the discovery well in the Cranfield pool. On January 1, 1944, the company began gathering and handling oil in the Pickens field, following purchase of the Allied Pipe Line Corp.'s gathering system in that field. The purchase included 13 miles of line, adequate tankage, and a 20-car loading rack near the town of Pickens. A few months later the company extended operations into the Eucutta and Heidelberg pools.

Construction will be started soon in the Rocky Mountain area by Oklahoma Pipe Line Co., Tulsa, on 7 miles of 8-in. line between Frannie, Wyo., and Warren, Mont., following recent approval by PAW.

This pipe line will deliver oil from the Frannie field to the Warren station of the Yale Oil Pipelines' system now under construction, for delivery to the Carter Oil Co.'s refinery in Billings, Mont.

Pipe-Line Outlet Approved By PAW for Russell Pool

FORT WORTH. — Atlantic Pipe Line Co. has received from Petroleum Administration for War authority to construct a pipe-line outlet for the Russell pool, in northwestern Gaines County, West Texas. The project consists of 5 miles of 4-in. line, to connect with the Wasson-Hobbs 6-in. line. The Russell pool has three producers.

Tennessee Gas Line Is Half Completed

A total of 639.8 miles of pipe, representing 50 per cent of the trunk line for Tennessee Gas & Transmission Co.'s system, had been laid up to July 24, in the construction of the 24-in. from Corpus Christi, Tex., to West Virginia. Last week work was reported progressing at the rate of 13½ miles per day, a pace which had been maintained for several days. An average of 10 miles per day is being consistently achieved by the 23 spreads engaged in the construction. In the month following June 24, 292.6 miles were laid.

Station 6, Monroe, La., and No. 8, Batesville, Miss., were 85 per cent completed and other stations were 35 to 70 per cent completed on July 24.

With the exception of 15 steel buildings and certain consignments of station piping and valves, all major items of equipment, including compressors and pipe, have been delivered.

Swinterton & Walborg Co. has moved to a section extending 30 miles west from the Tennessee River.

J. R. Horrigan Construction Co. has completed 47 miles of the line in West Virginia. On July 19 that firm moved one spread to Tennessee and another spread to a section in Kentucky, starting at the Big Sandy River.

The 20-mile section of line near the dehydration plant has been tested with 800 lb. air pressure. The line has been designed for operating pressures of 750 lb.

Michigan Natural-Gas Line Is Authorized

The Michigan Public Service Commission has authorized Michigan Consolidated Gas Co. to construct a natural-gas pipe line between Greenville and Belding, Mich., the project to be completed by the end of the year.

Pipe-Line Transportation of Motor Fuel Increases

WASHINGTON.—Bureau of Mines records show that pipe-line transportation of motor fuel in May was greater than in April and than in May of 1943. Volume turned into pipe lines in the first 5 months of the year totaled 104,723,000 bbl., against 71,006,000 bbl. in the similar period of 1943, an increase of 47.48 per cent.

Total motor fuel turned into lines in May was 23,079,000 bbl., compared with 22,200,000 bbl. in April, a gain of 3.40 per cent. Compared with 18,937,000 bbl. in May 1943, it was an increase of 21.87 per cent.

Motor-fuel deliveries from lines in the first 5 months of the year totaled 100,277,000 bbl., against 69,073,000 bbl. in the corresponding 1943 period, a gain of 45.18 per cent. In May the total delivered from lines was 22,929,000 bbl., against 20,586,000 bbl. in April, and 19,076,000 bbl. in May 1943. This was a gain of 20.20 per cent over 1943 deliveries in May.

Stocks in lines and working tanks at the end of May totaled 12,036,000 bbl., compared with 12,425,000 bbl. a month earlier, and 8,109,000 bbl. a year earlier.

Calculations from Bureau of Mines figures indicate that the volume of motor fuel turned into pipe lines was approximately 38 per cent of the total production of motor fuel in May. This is based on a total production of 61,191,000 bbl. A year earlier, motor fuel turned into lines totaled 18,937,000 bbl., or 39 per cent of the total motor-fuel production of 48,482,000 bbl.

New Booster Station Will Increase Hildreth Outlet

FORT WORTH.—Sinclair Prairie Pipe Line Co., important transporter of crude in North Texas, is taking steps to increase the capacity of its pipe line serving the Hildreth pool, in southern Montague County. The Sinclair refinery in Fort Worth uses large quantities of North Texas oil, and it seeks to handle oil from lease tanks by gravity.

The company is building on the north edge of the field a booster station that will handle 5,000 bbl. of crude daily. It has let contract also for construction of 1¼ miles of 4-in. and 3½ miles of 6-in. line. The latter will connect with the company's system running northward.

Army Building Pipe Line in China-Burma-India Area

WASHINGTON.—U. S. Army engineers are building a pipe line in the China-Burma-India theater for movement of petroleum to the Allies. The War Department, in making the announcement last week, said this important project, which has been under way for months, is making satisfactory progress. Nothing was revealed concerning the route of the line, its length or the identity of the men involved in the enterprise, which has no connection with oil sources in Arabia.

The line is designed to carry oil to Allied troops from a great distance, thus eliminating the hazards of surface transportation.

It is expected to have great influence on commerce between nations in the postwar world, creating a new route which may spell the development of vast resources hitherto untouched. The line may come in for a share of the discussions of Anglo-American oil relations in Washington.

Building of this pipe line is the culmination of repeated surveys by Army engineers, many of whom said it could not be done. The pipe line is also another laurel for American industry. There was one man, W. C. Kinsolving, whose early years on a pipe-line gang, coupled with college training and later years in the oil business led him to believe it could be done. He has been prominently identified with a major oil company in the Southwest.

BUCKEYE MODEL 12 digs more trench in less time, at lower cost. Digs trench 15" to 24" wide — up to 5½' deep.

BUCKEYE TRACTION DITCHER COMPANY
Findlay, Ohio
Built by Buckeye
TRENCHERS · SHOVELS · CRANES
BACKFILLERS · TRACTOR EQUIPMENT

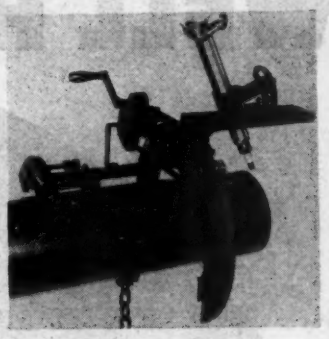
C. S. FOREMAN COMPANY

General Contractors

PIPE LINES

20 West Ninth Street
Kansas City, Missouri

Cut & Bevel Any Pipe With Maximum SPEED Minimum COST



The H & M PIPE CUTTING and BEVELING MACHINE

SPEED: Complete cut and bevel can be made on 12 inch pipe in about 2 minutes.

ECONOMY: Save approximately one-half labor and gas costs.

PORTABILITY: Can easily be carried from one pipe section to another.

Write for Literature

The H & M
Pipe Beveling Machine Co.
20 East 25th - - Tulsa, Oklahoma

Used OVER and OVER

"They were having trouble with quicksand so they drove pipe with perforated ends into the sand and extracted the water in vacuum. The header is 6"ID steel pipe, approx. 200' long. The 51 intake lines are 1½"ID, 4' apart."

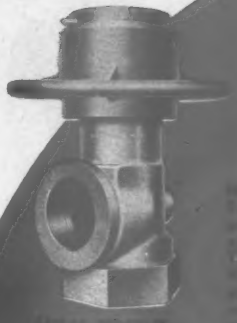
The Dresser Couplings on these lines have been used 15 times.

● Shipments of Dresser Couplings, Sleeves, Fittings and Repair Products in the Southwest made same day orders are received.

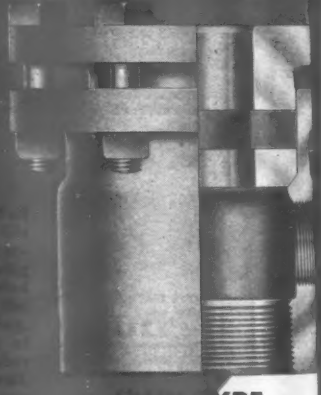
DRESSER
HOUSTON WAREHOUSE
1121 Rothwell St. Sec. 16, Houston, Texas

NORRIS

WELL HEAD EQUIPMENT



SEND FOR
Descriptive Bulletin
No. 32
Illustrates all NORRIS Well Head Equipment with complete specifications



EXPERIENCE BUILDING OIL TOOLS SINCE 1882

W.C. NORRIS MANUFACTURER, INC

TULSA, OKLAHOMA

BRANCHES
HOUSTON, KILGORE, ODESSA, TEXAS. SALEM, ILLINOIS
West Coast Distributors:
REPUBLIC SUPPLY COMPANY OF CALIFORNIA, Los Angeles

EXPORT OFFICES:
Room 1940 30 Rockefeller Plaza,
New York City

BUY WAR BONDS FOR VICTORY

Exploration and Drilling

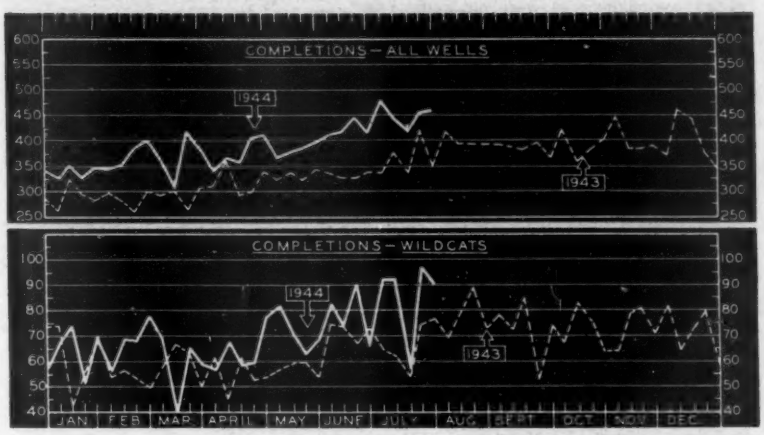
Week's Highlights

CONTINENTAL OIL CO. and Sinclair Prairie Oil Co. have completed a successful wildcat east of Bowie, in southern Montague County, Texas, that offers some interesting items in several respects. The well was finally completed from the conglomerate at 6,228-35 ft., flowing 35 bbl. per hour for 5 hours through a 3/4-in. choke, which is a good well in any territory.

The map shows that the new well is in a petroliferous region that extends along the south flank of the Red River Uplift, along which many fields have been found since the famous Burkburnett pool was discovered. Production is found in these fields anywhere from the shallow Strawn formation down to and including the Simpson and Ellenburger, in some cases in more than one pay. The present well was drilled in accordance with the modern tendency to drill a wildcat to the Ellenburger and determine the possibilities of all potential producing horizons in the first test of any promising looking structure.

The well was drilled to 8,018 ft., topping the Ellenburger, the deepest probable producing zone at 7,930 ft. The Ellenburger proved dry. Next a showing at 7,545 ft. was tested and swabbed some oil. After acidizing, the well swabbed oil and increasing amounts of salt water. When this upper showing was condemned, testing started at lower depths and progressed upward. At 7,845 ft., a slight show was encountered, but acidizing failed to increase the oil. Next a show at 7,560-90 ft. was tested and swabbed 16 bbl. in 2 hours. But after acidizing, salt water showed up on swabbing, although there was a slight increase in the oil. Finally the casing was perforated to test at 6,228-35 ft., and the well immediately started flowing from the conglomerate just below the Caddo.

Careful and painstaking geological work, matched by equal care in logging, and skillful completion work, finally brought success. Yet a little negligence here or there, a little less care, and another dry hole wildcat might easily have been entered on the books of the scouts.



Solid line charts current weekly completions

COMPLETIONS IN ALL FIELDS . . .

(Week ended July 29, 1944)

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1944	1943
N. Y., Penna., W. Va.	40	24	3	67	121,440	*1,849	1,920
Ohio	6	12	4	22	53,849	543	485
Indiana	1	0	2	3	5,480	121	131
Kentucky	7	4	3	14	25,627	387	215
Illinois	34	0	9	43	107,359	1,009	985
Michigan	4	0	8	12	25,702	355	308
Kansas	20	1	18	39	131,455	1,020	911
Nebr., Mo., Iowa	0	0	0	0	0	16	27
Oklahoma	22	3	13	38	140,169	945	640
Texas:							
North Central	22	0	16	38	108,192	822	747
West	34	0	3	37	187,190	847	474
Panhandle	12	0	1	13	43,908	124	100
Eastern	1	0	6	7	44,472	194	153
Gulf Coast	11	5	17	33	235,266	656	249
Southwest	3	1	5	9	27,902	409	511
Total Texas	83	6	48	137	646,930	3,052	2,234
Louisiana:							
Northern	2	1	2	5	29,749	164	179
Southern	9	0	2	11	95,503	274	211
Total Louisiana	11	1	4	16	125,252	438	390
Arkansas	1	0	2	3	14,488	125	141
Mississippi	3	0	6	9	45,586	77	55
Southeast states	1	0	0	1	5,317	21	†
Montana	3	1	3	7	14,844	178	115
Wyoming	3	0	1	4	19,580	91	67
Colorado-Utah	0	0	0	0	0	17	10
New Mexico	8	1	0	9	28,012	225	121
California	25	2	8	35	171,307	1,118	726
Total United States	272	55	132	459	1,682,397	11,587	9,481
Total previous week	251	45	157	453			
Total July 31, 1943	198	28	122	348			

*Does not include 38 pressure wells. †Included in total shown for Mississippi.

KANSAS

57 New Locations Made Including 12 Wildcats

COMPLETIONS this week dropped to 39 compared to last week's record-breaking total of 50, but the drilling pace is evidently going to be accelerated as 57 new locations were announced for the week, including 12 new wildcat starts. Of this week's completions, 20 were oil wells, 1 was a gas well and 18 were dry holes, in which were included 2 small wildcat oil producers and 9 dry wildcat tests.

Barton County.—Phillips Petroleum Co. completed its 1 Chal, a wildcat in the SE SE NW 25-16-14w, north of the Barrett pool in the Arbuckle at 3,404-42 ft., and after acidizing with 1,000 gal. was given a potential of 140 bbl.

In the Feltes pool, Black Marshall 2 Weber "A," S/2 SE SE 11-16s-12w, was completed in the Arbuckle at 3,335-37 ft., and given the maximum potential of 3,000 bbl.

Ellis County.—The Riverview pool had two completions this week, both of which were given maximum potential of 3,000 bbl.; Champlin Refining Co. 2 Johnson "B," SE NE SW 29-11s-18w, which had Arbuckle pay at 3,580-82 ft., and the same company's 3 Johnson "B," SE SW SW same section, which had Arbuckle at 3,522-26 ft.

Graham County.—Barnett et al had a good completion in the Morel pool, their 1 Clack, SE SE SW 9-9-21w, being given a potential of 2,675 bbl. from Arbuckle pay at 3,730-41 ft.

McPherson County.—Derby Oil Co. 1 Day, a wildcat north of the Ritz-Canton pool, in the NE NE NE 1-19-2w, was completed for 100 bbl. from the Mississippi chat at 2,984-3,006 ft.

Stafford County.—Magnolia Petroleum Co. 2 Ranson, NE SW NE 7-24-11w, in the Ranson pool, found the Viola pay at 3,793-95 ft., and was given maximum potential of 3,000 bbl. Atlantic Refining Co. 1 Schoop, NE NE NW 31-25-13w, in the McCandless pool, had Simpson pay at 4,244-58 ft., and on test was assigned a potential of 1,548 bbl.

KANSAS WILDCAT COMPLETIONS

Barton County: Phillips Petroleum 1 Chal, SE SE NW 25-16-14w, 140 bbl. potential after acidizing with 1,000 gal., Arbuckle pay zone 3,404-42 ft., TD 3,442 ft., Arbuckle top 3,401 ft.

Dickinson County: Phillips Petroleum 1 Lillian, SE SE SE 28-12-1e, dry, TD 3,310 ft., Arbuckle 3,276 ft.

McPherson County: Derby Oil 1 Day, NE NE NE 1-19-2w, 100 bbl. from Mississippi pay zone 2,984-3,006 ft., TD 3,006 ft., top Mississippi chat 2,983 ft.

Morris County: Doctor Franks 1 Nelson, SE SW 6-15-7e, dry, TD 2,988 ft., granite 2,967 ft.

Frank Deiter et al 1 Porter, NE NE SW 24-1n-9e, dry, TD 2,382 ft.

Norton County: Phillips Petroleum 1 Myra, NE NE NW 36-3-23w, dry, TD 3,732 ft., granite wash 3,705 ft.

Reno County: Adair & Morton 1 Koch, SE SE SE 18-25-4w, dry, TD 4,142 ft. Arbuckle 4,090 ft.

Saline County: Anderson-Prichard 1 Currie, NE NW SE 12-15-1w, dry, TD 2,665 ft., Mississippi lime 2,636 ft.

Sedgwick County: Atlantic Oil 1 Friends University, W/2 SW SE 6-25-2w, dry, TD 4,130 ft., Arbuckle 4,047 ft.

Beech Aircraft 1 Shinn, SW SW NE 15-28-2e, dry, TD 3,426 ft., Arbuckle 3,388 ft.

Stafford County: J. M. Huber 1 Ward, NE NW NE 36-25-12w, dry, TD 4,304 ft., Arbuckle 4,254 ft.

ILLINOIS

Wildcats in Three Counties Showing as Discoveries

CENTRALIA. — Wildcats in Franklin, Gallatin and Jefferson counties were giving favorable indications of new pools in the week past. Six miles northwest of Benton, Weller, Randall and Schoonmaker 1 U. S. Coal & Coke Co., NW SW SW 14-5s-2e, on a 1-hour drill-stem test, developed 255 ft. of clean oil, 30 ft. of oil-cut mud and no water, and 1,100-lb. bottom-hole pressure. The well is 3 miles from production. In Gallatin County, 2 miles southeast of New Haven, Leach, Swann, et al 1 Goforth, SE SE SW 27-7s-10e, swabbed 453 bbl. of oil in 24 hours after the cleanout job following the shot in Tar Springs sand at 2,094-2,122 ft. It was being put on the pump. It is about 3 miles from other production. In Jefferson County The Texas Co. 1 E. Kasban, SE SE NW 8-2s-1e, swabbed 320 bbl. of oil and 7 bbl. of water in 18 hours from Rosiclare lime at 2,116-28 ft. Benoist sand at 1,916-32 ft. showed oil but the pay was temporarily passed up following a drill-stem test. In the West Coil pool Gulf Refining Co. 1 Amanda, SE SW SW 14-1s-4e, swabbed 213 bbl. of oil and 130 bbl. of water in 15 hours.

Forty-six new operations were reported during the week, among which were 9 wildcats as follows: In Crawford County, The Texas Co. 1 John Roderick, SW SW SW 27-5n-13w; Cumberland County, Phillips Petroleum Co. 1 W. L. Ford, SW SE NW 15-9s-9e; Effingham County, Kingwood Oil Co. 1 A. Mullendorf, NE NE SW 32-6n-7e; Fayette County, Magnolia Petroleum Co. 1 Carsons, NE SE NE 8-6n-2e; Jefferson County, Cameron 1 J. E. Bizot, NW NE NW 30-1s-2e; Schuyler County, Northern Ordnance Co. 1 T. B. Greuel, NW NW NE 7-3n-1w of fourth principal meridian; Richland County, The Texas Co. 1 Kesler, SW SW NE 10-4n-10e; Wabash County, Fox 2 Woodyard A, NE NE SE 33-2s-13w; Wayne County, Pure Oil Co. 1 D. Dalton, NE NE SE 1-1s-8e.

ILLINOIS WILDCAT COMPLETIONS

Bond County: T. M. Conrey 1 J. H. Wilde, NE NE SE 16-4n-2w, dry at 1,328 ft. Vienna 852 ft., Cypress 1,088 ft., Benoist, 1,205 ft., Aux Vases 1,246 ft., Ste. Genevieve 1,320 ft.

Coles County: H. D. Daugherty 1 M. Reinhart, SE NE SE 29-12n-8e, water at 410-55 ft. Rig skidded 5 ft. west for new hole.

Edwards County: Luttrell 1 Ed Highsmith, SE NE NE 9-2n-11w, dry at 1,724 ft. No log.

Fayette County: John W. Myers 1 Cocagne, NE SW SE 19-6n-1e, dry at 1,814 ft. Menard 1,106 ft., Cypress 1,436 ft., Aux Vases 1,620 ft., Ste. Genevieve 1,668 ft., Rosiclaire 1,679 ft., Fredonia 1,704 ft.

Madison County: E. A. Obering 1 D. Bird, SE NW SE 8-4n-6w, Devonian lime 1,723-47½ ft., TD; 45 bbl. of oil in 24 hours. New pool or extension to Marine pool.

Wabash County: Allied Oil 1 Dunn, NE cor. SW 11-3s-14w, dry at 2,161 ft., Menard 1,987 ft., Vienna 2,105 ft., Tar Springs 2,114 ft.

St. Clair County: T. W. McCurdy, NW SW SW 29-3s-6w, dry at 618 ft. No log.

DAILY AVERAGE PRODUCTION FOR WEEK

	July 29 crude oil	Distillate, allied products	August PAW quota all oils	July 22 crude oil
Arkansas	80,500	4,500	82,500	80,500
California	854,750	51,100	917,100	855,250
Colorado	9,000	.....	7,900	7,800
Eastern	62,200	6,100	77,500	66,100
Illinois	207,600	11,500	226,500	206,550
Indiana	13,400	.....	14,000	12,800
Kansas	279,250	4,300	278,300	285,300
Kentucky	24,300	2,500	25,500	24,400
Louisiana	359,350	35,000	385,000	359,050
North Louisiana	72,350	.....	.....	72,050
South Louisiana	287,000	.....	.....	287,000
Michigan	50,850	400	51,400	50,500
Mississippi	45,050	.....	40,000	44,950
Montana	21,100	200	24,200	23,600
Nebraska	900	.....	1,000	950
New Mexico	108,500	5,500	115,500	108,250
Oklahoma	339,500	27,000	359,000	341,200
Texas	2,067,300	138,000	2,237,000	2,067,300
East Texas	363,550	.....	.....	363,550
East Central Texas	148,300	.....	.....	148,300
North Central Texas	151,600	.....	.....	151,600
Texas Panhandle	89,150	.....	.....	89,150
West Texas	463,550	.....	.....	463,550
South Central (San Antonio)	19,700	.....	.....	19,700
South Texas (Laredo)	78,200	.....	.....	78,200
Lower Gulf Coast	221,850	.....	.....	221,850
Upper Gulf Coast	531,400	.....	.....	531,400
Wyoming	93,900	3,000	103,000	87,900
Total United States	4,617,450	289,100	4,945,400	4,622,400
Total production January 1-July 29, 1944				943,085,950 bbl.
Same period last year				828,182,350 bbl.

TEXAS GULF COAST

Hardin Discovery to Explore Deeper Wilcox

HOUSTON. — American Republics Co. and Houston Oil Co. 2 H&TC-fee, H&TC Survey, Section 189, Hardin County, 933 ft. west of the 1 H&TC-fee, Cockfield discovery at Beech Creek field, is drilling ahead below 8,528 ft. to test Wilcox. This well had the discovery sand, showing oil, from 6,240-45 ft.

British-American Oil Producing Co. is running another drill-stem test at the 1 Ed Hurta et al, outpost and new sand discovery well at Needville field in Fort Bend County, in perforations from 5,201-08½ ft. On first attempt the tester clogged. The sand had shown oil on previous drill-stem test. This well established production in perforations from 6,547-52 ft. to open a deeper sand for the area, flowing 73 bbl. of oil in 21 hours through 5/32-in. choke, tubing pressure

2,165 lb. Total depth of this well is 6,852 ft. with 5½-in. casing set at 6,798 ft.

Seaboard Oil Co. 1 Rudolph Holub, in E. L. Wilson Survey, southeast extension to El Campo field, Wharton County, is dual-completed. One horizon made dry gas and the other flowed oil. This well was drilled to 7,715 ft. and plugged back to 7,606 ft. Upper sand topped at 6,808 ft. was perforated with 24 holes from 6,820-24 ft., and potential test was 157.17 bbl. daily on ⅛-in. choke, with casing pressure of 1,100 lb. gas-oil ratio 954:1, gravity 38.9°, no water. Lower sand, perforated from 7,588-92 ft., produced dry gas, with tubing pressure of 2,225 lb., and was shut in.

Edwin Nielson et al are reported setting casing in the 1 Winnie Poole, GH&H Sur. 25, in the Lissie area of Wharton County. It is reported to have picked up a sand carrying good shows at 7,080-7,104 ft. Total depth is 7,204 ft. This test is about ½ mile west of Salt Dome Oil Co. et al's gas-condensate well.

UPPER GULF COAST WILDCAT COMPLETIONS

Brazoria County: Pure Oil Co. 1 G. S. Johns, Joseph White Sur., Abts. 136, 7 mi. W of West Columbia, TD first hole 8,730 ft., PB and sidetracked at 4,620 ft., new TD E,863 ft., dry.

Chambers County: Gulf Oil Corp. 1 S. Steenerson et al, Fig Ridge area, T&NO Sur., dry at 9,209 ft.

Colorado County: Cities Service Oil Co. 1 Everett, Ramsey area, 8 mi. NW of Eagle Lake, dry at 9,389 ft.

Jackson County: Butcher-Arthur, Inc. 1 E. C. LaBauve et al, Hugh McGaffin Sur., 10 mi. SW of LaWard, dry at 7,508 ft.

B. G. Von Roeder et al 1 Marcus Rosenwasser, T. H. P. Heard League, Abst. 30, 4 mi. SE of Cordele, dry at 5,430 ft.

Wharton County: H. C. Cockburn 1 H. P. Stockton, R. Boatright Sur., 3 mi. NW of East Bernard, dry at 7,964 ft.

EASTERN TEXAS

Bowie County Wildcat Flows Oil From Smackover

DALLAS.—Barnsdall Oil Co. and Sohio Petroleum Co. 2 Heilbron, Smackover lime discovery producer 5½ miles southwest of Texarkana, Bowie County, which tested gas and straw-colored distillate at 7,686-96 ft., flowed 27 bbl. of 38-gravity oil per hour after deepening to 7,716 ft. Operators then squeezed off the gas-condensate zone and were preparing to test again.

Smith County.—Phillips Petroleum Co. this week announced two more new locations in the area now officially designated as the South Tyler field around its 1 McMinn wildcat discovery, which was taking potential test. On 10/64-in. choke it gaged 265.1 bbl. of 47.4-gravity oil, gas-oil ratio 7,240 to 1. The two new locations, which are in addition to Phillips 1 Grelling and 1 Englander announced last week, are for 1 Mrs. Leo Dar Craver, in the M. M. Long Survey, 1,350 ft. east of the discovery, and 1 Harriston-Johnson, on a 40-acre unit in the J. Hope Survey A-443, also east of the discovery. They are all 10,000-ft. tests.

Red River County.—The Texas Co. 1 Solomon was drilling below 4,761 ft. after topping massive anhydrite at 3,790-3,820 ft. and logging base of the massive at 3,880-3,910 ft. Porous lime cuttings at 3,880-3,910 ft. and porous sand cuttings between 3,910-70 ft. carried small shows of oil. This well is 8 miles southeast of Clarksville.

Shelby County.—Ce-Beth Oil Co. 1 J. M. Smith, wildcat in the McKelvy Survey, had base of massive anhydrite at 5,398

"CLEVELANDS"

Taking the Tough Jobs In Stride Is a Proved CLEVELAND CHARACTERISTIC

For more than twenty years "CLEVELANDS" have been put to the toughest tests on hundreds of ditching jobs in all sort of soils and over the roughest terrain, and have continuously, according to record, delivered maximum performance. Today, and since the war started, "CLEVELANDS" have been in service on a multitude of government projects at home and overseas.

Contributing to "CLEVELANDS" ability to deliver top performance under normal or emergency conditions are these features: Multi-speed Transmission—Abundant Power—Operating Ease—Maximum Maneuverability—High Capacity Digging Wheel—Correct Design—Unit Type Construction—Top Quality Material.

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE. "Pioneer of the Small Trencher" CLEVELAND 17, OHIO
"CLEVELANDS" Save More . . . Because they Do More

ft. and in core from 5,499-5,521 ft. recovered a few fragments of light brown lime with show of gas, taste of distillate in fresh breaks, and spotted oil stains.

EAST TEXAS WILDCAT COMPLETIONS

Cherokee County: Humble Oil & Refining Co. 1-B Wm. H. Stephens, 6,860 ft. from W, 2,548 ft. from S, J. Jordan Sur., 287.7-ac. tract, 4 mi. SW Bullard, Larissa area, electric log tops: PG 3,565-4,046 ft., Austin 4,705-4,965 ft., Woodbine 5,120 ft., TGL 6,025 ft., TFW 6,790 ft., Goodland 7,434-7,700 ft., TGR 7,915 ft., first anhydrite 9,193 ft., massive anhydrite 9,930-10,110 ft., Rodessa porosity 10,110-10,124 ft., 10,280-95 ft., 10,322-36 ft., James 10,630 ft., first Pettit porosity 10,808 ft., second 10,890 ft., Travis Peak 11,045 ft., elev. 479 ft., dry, TD 11,347 ft.

Henderson County: E. B. Germany & Sons 1 H. E. Bonsell, 467 ft. from N and E, 2,850 ft. from N, Vincent Mitchell Sur., Paluxy test, 2½ mi. SW Eustace, elev. 393 ft., top Pecan Gap 2,144 ft., bottom 2,230-60 ft., top Austin 3,030-60 ft., bottom 3,500-10 ft., Woodbine 3,934 ft., dry, TD 5,405 ft.

Kaufman County: Mae Belcher 1 C. R. Nells, 330 ft. from N cor. 87.8-ac. tract, E. W. Guthrie Sur., 3 mi. NW Scurry, elev. 416 ft., Austin 1,195-1,705 ft., Woodbine 2,135 ft., dry, TD 2,170 ft.

Navarro County: J. W. Hoosier and J. H. Barke 1 S. E. Johnson, 536 ft. from SW, 2,800 ft. from NW, J. P. Hardin Sur., ½ mi. N Powell, elev. 382 ft., Austin 2,680-3,190 ft., dry, TD 3,654 ft.

Panola County: McAllister Fuel Oil 1 J. B. Hunt, 890 ft. from W, 532 ft. from S of most southerly S. B. (J. F.) Hunt 5,425-ac. tract in W. Anderson Sur., 2 mi. SE Carthage, elev. 305 ft., first anhydrite 4,315 ft., massive anhydrite 4,740-4,986 ft., had break 5,105-08 ft., well blew out, made est. 20,000,000 cu. ft. gas, mud and wash water, no oil, cemented drill pipe in hole with 635 sacks (skidded derrick), junked, TD 5,108 ft.

Van Zandt County: Humble Oil & Refining Co. 1 Joe Surratt, 660 ft. from SW and NW 68-ac. tract, approx. 2,100 ft. from NE, 2,225 ft. from NW, J. W. Wade Sur., 1 mi. SE Edgewood, elev. 440 ft., sub-Clarksville 3,722-32 ft., Woodbine 4,217 ft., Goodland 6,033-6,144 ft., Paluxy 6,114 ft., Glen Rose 6,458 ft., massive anhydrite 7,490-7,650 ft., Rodessa porosity 7,705 ft., Pettit 8,255 ft., Travis Peak 8,380 ft., dry, TD 8,562 ft.

FOR SPECIAL JOBS!.....

The AMERICAN line of Heavy Duty Roller Bearings is not limited merely to the standard types that have made AMERICANS famous the world over. Special Roller Bearings—such as the one illustrated—include all the advantages of AMERICAN Heavy Duty Roller Bearings plus additional special features to meet your own specifications. Our engineering knowledge, resulting from years of Roller Bearing experience, is yours for the asking. Consult us about your special needs as well as for your more usual requirements.

AMERICAN ROLLER BEARING CO.
PITTSBURGH PENNSYLVANIA
Pacific Coast Office: 1718 S. Flower Street, Los Angeles, California

AMERICAN ROLLER BEARINGS HEAVY DUTY

AMERICAN
Heavy-Duty ROLLER BEARINGS

N. CENTRAL TEXAS

New Caddo Discovery In Young County

WICHITA FALLS.—Sohio Petroleum Co. 1 J. R. Garvey, wildcat 3 miles north of Farmer, topped Caddo lime at 4,463 ft., drilled to total depth of 4,485 ft. and tested 4 to 5 bbl. of oil per hour, natural. After treating with 1,000 gal. of acid it flowed at the estimated rate of 40 bbl. per hour, then retreated with 1,000 gal. after which its production was estimated at 35 to 40 bbl. per hour. It is in Section 1,856, TE&L Survey.

Montague County.—Stanolind Oil & Gas Co. 1 W. F. Gossett is a new 7,000-ft. wildcat location 8 miles northwest of Bowie, staked 660 ft. out of the southwest corner of Section 39, ETRR Survey A-245. The county's newest wildcat discovery, Continental Oil Co. 1 J. M. Hundley, 7 miles southeast of the town of Montague, Martindale Survey, on preliminary gage flowed 257 bbl. of oil in 5 hours through ¾-in. tubing choke after perforating casing at 6,228-35 ft., opposite saturated conglomerate pay. Drilled to total depth of 8,018 ft., it previously had tested the Simpson at 7,560-90 and 7,743-7,845 ft., which yielded about 100 bbl. of oil and 100 bbl. of salt water daily. Sinclair Prairie Oil Co. 1 J. W. Bass, a wildcat 6 miles east of Bowie, tried unsuccessfully to make a drill-stem test of lime showing oil at 6,026-61 ft., and was running Schlumberger at total depth of 6,355 ft. in shale.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County: Cochran & Cain 1 Central Hanover Bank & Trust Co., G. P. Meade "L-M Pasture" Sur., Lot 51, 4 mi. E Westfork, elev., 1,103 ft., ilme

Perry & Woody et al 1 G. P. Prideaux, Robt. Cressman Sur. A-5, 3 mi. S and 4 mi. E Westfork, elev. 1,103 ft., lime show oil 751-64 ft., scidized 1,000 gal., pumped 5 bbl. day, TD 764 ft.

Rathke Oil Co. 1 H. F. Harmel "B," G. P. Meade "L-M Pasture" Sur., Sec. 44, 3 mi. N and 3 mi. E of Megargel, elev. 1,237 ft., TGL 1,470-72 ft., dry, TD 1,561 ft., shale.

Staley Oil Co. 1 Henry Harrison, Clark and Plumb Sur., Lot 7, Blk 5, 4 mi. S and 4 mi. E Archer City, dry, TD 1,106 ft.

W. C. Young 1 J. F. Kovar, Meade "L-M Pasture" Sur., Blk. 53, 3 mi. E and 1 mi. N of Megargel, elev. 1,269 ft., sand show oil 1,445-49 ft., dry, TD 1,449 ft.

Montague County: Phillips Pet. Co. 1 Gould Whaley, BBB&C Sur., Sec. 16, 3 mi. E Nocona, elev. 934 ft., Simpson 5,552 ft., Ellenburger 5,602 ft., dolomite 5,602-5,800 ft., dolomite 5,800-6,032 ft., dolomite lime 6,032-6,739 ft., dry, TD 6,739 ft.

Wichita County: Manning & Brown, Inc. 1 I. H. Kempner et al, Denton CSL, Blk. 33, 3 mi. W and 4 mi. S Wichita Falls, elev. 983 ft., sand show oil 4,868-

76 ft., Caddo 5,252 ft., Ellenburger 5,551 ft., dolomite slight show oil 5,551-54 ft., dry, ran Schlumberger, TD 5,608 ft.

Primo Oil Co. 1 I. C. Burk, Cowheard Bros. Sur., Lot 22, 3 mi. S of Iowa Park, elev. 979 ft., sand show oil 800-22 ft., tight sandy lime show oil 4,287-4,301 ft., KMA 3,988 ft., sand show oil 4,115-19 ft., sand show oil 4,129-35 ft., sand show oil 4,288-92 ft., Barnett 4,895 ft., Ellenburger 5,036 ft., ran Schlumberger, dry, TD 5,064 ft.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Callahan County: Harry Hinds 1 U. J. Knuckles, 990 ft. from S, 330 ft. from W, Sec. 65, Blk. 14, T&P Sur., 1,920-27 ft., sand, hole full of water, no show oil or gas, dry in Cook sand, TD 1,927 ft.

Jones County: Geochemical Survey, Inc. 1 A. A. Gustafson, 1,050 ft. from N, 2,150 ft. from E, Sec. 8, Blk. 4, H&TC RR. Co. Sur., 3 mi. SW Stamford, 1,650-1,790 ft., broken sand dry, 2,820-2,930 ft., 3,330-85 ft., 4,172-4,232 ft. sand (Palo Pinto section), did not reach Ellenburger lime, dry, TD 4,680 ft.

McCullough County: D'Arcy M. Cashion 1 S. E. Smith heirs, 5,600 ft. from S, 2,950 ft. from W, Eckhardt Sur. No. 1,293, 6 mi. NW Waldrip, Ellenburger 2,280 ft., 1,545 ft. lime, slight show gas, Ellenburger lime 2,496-2,502 ft., dry, TD 2,502 ft.

Stephens County: B. L. Abbott 1 Lawrence Smith, 330 ft. from N, 979 ft. from W, 160-ac. tract, Sec. 37, Blk. 5, T&P Ry. Sur., TP 3,275 ft. Caddo lime, treated with 2,000 gal. acid 3,275-90 ft., retreated with 500 gal. acid, completed from Caddo lime, IP 7 bbl. day, TD 3,301 ft.

ROCKY MOUNTAIN

Ohio Oil Gets Morrison Producer at Lance Creek

DENVER.—The Lance Creek field in eastern Wyoming furnished another surprise this week. Ohio Oil Co. 9 Converse Sheep, NW SW SE 32-36n-56w, drilling below the Dakota sands and above the Sundance, encountered oil in the Morrison and stopped for a drill-stem test at 3,400-35 ft. With tester open 50 minutes it began flowing at the rate of 35 bbl. an hour of 40-gravity green oil. While shows have heretofore been encountered in the Morrison, these have never been tested. The Ohio well is on the top of the structure and it is believed the horizon will be rather limited in productive area.

Lease play in Utah.—With much of the preliminary work in search of promising structures in Colorado, Wyoming and Montana drawing to a close, a number of large companies and some independent operators have begun leasing on an extensive scale in Utah.

Most all of the old structures leased up years ago and later turned back are being taken up again and geophysical crews are at work in the state on a considerable scale for the first time.

Bell Rock wildcat in Dakota.—Stanolind Oil & Gas Co. 1 Hanawalt, NE SE SE 4-6n-92w, Bell Rock structure, Moffat County, Colorado, joint with the Continental Oil Co. and Ohio Oil Co., found the top of the Dakota at 8,233 ft. and is drilling ahead at 8,243 ft., in very hard sand. No shows have been encountered in that formation. The objective is the Sundance.

McElmo wildcat drilling ahead.—Stanolind 1 Government, C SW NW 24-36n-18w, McElmo Canyon, Montezuma County, Colorado, cleaned up fishing job and

Post-War Battles Call for NAYLOR PIPE, Too!

Post-war pipe line problems will be simplified through the outstanding performance of Naylor Pipe with its exclusive Lockseam Spiralweld. Here's performance that no other light-weight pipe can match in extra strength, leaktightness and safety. The same advantages that have made Naylor a dependable supply weapon on the battle fronts make it a practical answer to peacetime requirements. Sizes from 4" to 30" in diameter with all types of fittings, connections and fabrication.

NAYLOR THREADED SURFACE CASING

offers substantial economies, particularly where field welding is impractical. The spiral helps centralize this casing in the hole. Uniform lengths, light weight and accurate threading speed handling and setting. Sizes from 13⅜" O.D. to 20" O.D. Interchangeable with A.P.I. standard casing.

Naylor

MID-CONTINENT SUPPLY COMPANY
Fort Worth, Texas and Branches
Exclusive distributors in Arkansas, Kansas, Louisiana, New Mexico, Oklahoma and Texas

NAYLOR PIPE COMPANY
1232 EAST 92nd STREET • CHICAGO 19, ILLINOIS
NEW YORK OFFICE 350 MADISON AVE., NEW YORK 17, N. Y.

made a drill-stem test which showed 3,000,000 cu. ft. of gas per day. Some oil leaked from around the gage while the test was being made. Samples tested 54 gravity. It is drilling ahead at 4,797 ft. in the Pennsylvanian, with thick beds of that formation still to be drilled.

WYOMING WILDCAT COMPLETIONS

Barren Butte, Fremont County: Continental Oil Co. 1 Christiana, NE SE NW 32-27n-92w, TD 4,875 ft., in Pierre shale, base of Wasatch 2,300 ft., top of Mesa Verde 3,300 ft., top of Pierre 4,450 ft., dry and abandoned.

MONTANA WILDCAT COMPLETIONS

Marias River, Toole County: Napar Oil & Gas Co. 1 Zell, NW NW NE 31-32n-2w, TD 1,388 ft., no gas sand, plugged and abandoned.

Willshaw Block, Toole County: Texas Co. 1 Mars, SE NW NW 19-36n-1w, TD 1,980 ft., Sunburst 1,711-28 ft., dry, shot with 80 qt. in Ellis-Madison at 1,920-46 ft., dry and abandoned.

MICHIGAN

Deep River Well Makes 962 Bbl. as Week's Feature

SAGINAW.--Basin Oil Co. and Don Rayburn completed 5 Klenk in Section 8, Deep River Township, Arenac County, for initial flow of 962 bbl. daily, as the feature of a dozen completions in Michigan last week. Three smaller producers also were completed, two in Allegan County, one in Barry. Seven of the eight dry holes were wildcat tests.

The state conservation department issued 20 new drilling permits.

In the first drilling operations within Big Rapids city limits, Taggart Bros. Co. struck gas which gaged 2,000,000 cu. ft. daily at 1,093 ft. W. C. Taggart, company president, said he planned to have the gas shut off and drilling continued to the Monroe formation at about 3,800 ft. in exploration of oil possibilities. Gulf Refining Co. has ended a deep test near Bay City after drilling to nearly 8,000 ft.

MICHIGAN WILDCAT COMPLETIONS

Arenac County: Frank E. Roush 1 Isarael Chantiny, NW NW SE 13-18n-4e, dry in Monroe, TD 2,942 ft.

Cass County: Michill Development Co. 1 S. & H. Walker, NW NW SE 32-7s-13w, dry in Traverse, TD 965 ft.

Clare County: Freeman Oil Co. 1 Agnes J. Gleason, C NE NW NE 35-17n-4w, dry in Dundee, TD 3,831 ft.

Charles W. Teater 1 John A. Thompson, C N½ NE SW 26-19n-5w, dry, TD 2,004 ft.

Huron County: Charles W. Teater 1 Winnifred L. Clark, NW NW NW 14-18n-13e, dry, TD 2,025 ft.

Ionia County: Herman J. Schrauber 1 Roy Patrick, SW SW NE 4-5n-6w, dry in Alpena, TD 2,400 ft.

Isabella County: George Henry Flynn, Jr., 1 Irvin C. Shively, SE SW SE 32-16n-3w, dry, TD 1,535 ft.

CALIFORNIA

Deeper Gas Sand Shows in Old Rio Vista Field

LOS ANGELES. — Discovery appeared probable this week of a new gas zone in the Rio Vista field in the delta region of Sacramento and Solano counties by Standard Oil Co. of California. The field, largest in the state, already has two gas zones and has been on commercial gas production since conversion of the Stanpac gas line to crude oil early in the war. On a formation test at 5,760-5,805 ft. gas flowed at a daily rate of 14,700,000 cu. ft. Operators drilled ahead 50 ft. and bottomed the hole at 5,855 ft. The discovery is 6-H Perry Anderson, 36-4n-2e, and it is in the westerly part of the field. The new zone is located below the Hamilton, formerly the deepest producing horizon in the field.

The projected development program at Elk Hills already has accounted for three new wells completed. The program calls for the drilling of 300 new wells within a period of 10 months but it is possible that the maximum 65,000 bbl. daily production may be attained before completing the drilling program. Completion depths range from 2,825 ft. to 3,050 ft. and the formation permits fast digging. Average drilling time from spud to completion will probably average about 3 weeks. Shell Oil Co., Inc. has spudded 48 Alamitos in the Long Beach field as a projected deep test. Results of previous deep exploratory work have not been conclusive because all wells stopped in the Dormax zone.

Amerada Petroleum Corp. added another California discovery last week by completing 36-15 S.P. in Section 15-29s-29e at Ant Hill in Kern County pumping 70 bbl. daily of 14.1-gravity oil from 2,225 ft. The area is west and south of the old Kern River field.

Standard of California appears to have defined the northwestern limits of the deep sand in the Buena Vista Hills field of Kern County as its 378-21-B, in 21-31s 23e, failed to find pay.

FOR THE BEST IN CABLE TOOLS

Fig. D322

SPANG JARS

The steel specifications and the process of manufacture of Spang Jars are the result of long intensive study, field performance, and productive experience. Each step in making the forging is carefully planned, executed, and thoroughly inspected. The heat treatment is done in modern specially built furnaces with heat recording instruments, under the supervision of personnel with long experience.

For safety, efficiency, and long life, there is no substitute for Spang Cable Tools —SPECIFY SPANG.

THE HIGHER STANDARD

SPANG & CO.
BUTLER, PA.

YOUR DEALER SELLS SPANG TOOLS

CALIFORNIA WILDCAT COMPLETIONS

Ant Hill, Kern County: Amerada 36-15 S.P., 15-29s-29e, pumped 70 bbl., 14.1-gravity, 10 per cent cut, TD 4,159 ft., PB 2,225 ft., perf. 2,170-2,225 ft. This is new discovery.

Colusa, Colusa County: Union-General Petroleum 2 Capital, 27-16n-1w, dry, form. test 1,262-72 ft. flowed 4,000 cu. ft. gas, no oil, form. test 1,480-1,525 ft., flowed 2 bbl. per hour salt water and 15,000 cu. ft. gas, TD 2,600 ft.

Fillmore, Ventura County: Standard 2-1 Fillmore Comm., 24-4n-20w, dry, only minor showings recorded, TD 14,512 ft.

Mount Poso outpost, Kern County: Anderson, Giffen & Anderson 1 Durnal, 24-27s-28e, dry, TD 785 ft.

Placentia outpost, Los Angeles County: Providence Oil Co. 1 Chapman, 36-3s-10w, dry, TD 5,000 ft.

San Felipe, Imperial County: Standard 1 Southern Land, 27-11s-9e, dry, probably in basement schist, TD 4,531 ft.

APPALACHIAN FIELD

Logan County, W. Va., Test Opens New Gas Area

PITTSBURGH.—In Logan County, West Virginia, Columbian Carbon Co. completed a wildcat on Island Creek Coal Co. land in the Logan district, which gages 5,000,000 cu. ft. of gas with a rock pressure of 525 lb. Starting at a surface elevation of 936 ft., the Big lime was topped at 1,895 ft. with gas at 2,031-31½ ft. and total depth of 2,037 ft. A second test on this tract was also completed and is located 3 miles north 29° east of No. 1. Here, with a surface elevation of 893 ft., it was completed in the Corniferous lime, total depth 4,022 ft., and which formation was shot 3,260-3,560 ft. and gaged 219,000 cu. ft. with a 1-hour rock pressure of 60 lb.

In Putnam County, West Virginia, Godfrey L. Cabot, Inc., completed a Big lime gas well on Raymond City Coal & Transportation Co. land with a final gage of 2,939,000 cu. ft. of gas from pay struck at 2,013-22 ft. and 2,026 ft., total depth 2,040 ft. and 350-lb. rock pressure in 19 hours.

In Jackson County, Hope Natural Gas Co. abandoned 8585 B. M. Pfost in Washington district at 7,065 ft. It drilled through the Clinton sand (6,851-7,018) which was dry.

OHIO, KENTUCKY

Two Gas Wells Added in Southern Richville Pool

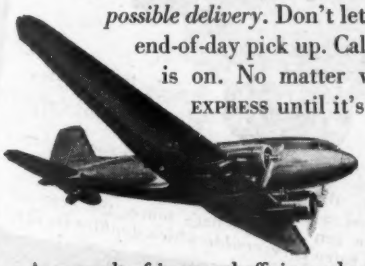
COLUMBUS.—Two good wells were completed in Section 1, Bethlehem Township, Stark County, in the south part of the Richville pool. East Ohio Gas Co. 1 Smith drilled Clinton from 4,504-87 ft., developing 1,915,000 cu. ft. of gas at 4,560-87 ft., and shut in at 2,166,000 cu. ft. after shot. Ohio Fuel Gas Co. 1 Schlegel had sand from 4,537-4,616 ft. with 1,130,000 cu. ft. at 4,588-4,616 ft., and shut in after shot at 2,070,000 cu. ft.

The Industrial Gas Co. extended the gas pool in the northwest part of Bloom Township, Morgan County, ½ mile east. The completion, 1 Gifford-Stewart, Section 9, had 351,000 cu. ft. in the Clinton at 4,475-4,504 ft. and shut in after shot at 800,000 cu. ft. with rock pressure of 1,100 lb.

Two wildcats have been located in Ash-

"I gotta date with 1000 Jeeps! Call AIR Express NOW!

IF AIR EXPRESS shipments could talk—and knew where they were going and why—we wouldn't have to urge you to *ship when ready*, especially if you are a manufacturer of war materials. For early shipment is the way to be certain of *earliest possible delivery*. Don't let shipments lie around for routine end-of-day pick up. Call AIR EXPRESS the instant the label is on. No matter what the label says, it isn't AIR EXPRESS until it's *on a plane!*



A Money-Saving, High-Speed Wartime Tool For Every Business

As a result of increased efficiency developed to meet wartime demands, rates have been reduced. Shippers nationwide are now saving an average of more than 10% on Air Express charges. And Air Express schedules are based on "hours", not days and weeks—with 3-mile-a-minute service direct to hundreds of U. S. cities and scores of foreign countries.

WRITE TODAY for "Vision Unlimited"—an informative booklet that will stimulate the thinking of every executive. Dept. PR-8, Railway Express Agency, 230 Park Avenue, New York 17, N. Y., or ask for it at any local office.

AIR EXPRESS
Gets there FIRST

Phone RAILWAY EXPRESS AGENCY, AIR EXPRESS DIVISION
Representing the AIRLINES of the United States

land County west of the proven area. Ohio Oil Co. 1 S. V. Kraus, Lot 14, Ruggles Township, and Frank Brendel et al 1 John W. Davidson, Lot 10, Troy Township.

INDIANA

EVANSVILLE, Ind.—Three completions were reported from Indiana fields during the week, one a 150-bbl. pumper in Posey County, Central Pipe Line Co. 2 Rutledge-Wade, SW SW NE 14-5s-14w, in the New Harmony Consolidated pool. No wildcats were completed.

WESTERN KENTUCKY

OWENSBORO, Ky.—Seven completions were reported from Western Kentucky fields during the week, including a couple of 150-bbl. wells in Union County, and a 60-bbl. discovery well of Sohio Petroleum Co. in Henderson County. Gulf Refining Co. drilled a dry hole wildcat in Henderson County.

WESTERN KENTUCKY WILDCAT COMPLETIONS

Henderson County: Sohio 1 Rash heirs, SW SW SE 24-O-25, 4 mi. E of Robards, Tar Springs sand at 1,710-23 ft., TD 1,727 ft., pumped 60 bbl. in 24 hours without a shot.

Gulf 1 Martin heirs, SE SE NW 14-Q-20, dry at 2,296 ft. Lower Kinkaid 1,564 ft., Cypress 2,271 ft., water at 2,286-96 ft.

McLean County: C. Morburger 1 Fred Troutman, NE NE NW 13-M-29, near Buck Creek Church, dry at 2,290 ft. Top of Ste. Genevieve lime 2,086 ft.

EASTERN KENTUCKY

ASHLAND.—Two oil wells and four gas wells were completed in eastern Kentucky fields last week, thus again pointing the development trend upward.

The Kentucky West Virginia Gas Co. completed 755 P. P. McCoy on Pond Branch of Brushy Fork in Pike County at 1,259 ft. with a daily production of 8 bbl. of oil from Maxon.

J. W. Turner, trustee, completed A. J. Oliver, Tract 2, Elliott County, with a daily oil production of 5 bbl.

The Kentucky West Virginia Gas Co. completed 5,542 William Hamilton, in Floyd County, with a daily open flow of 1,565,000 cu. ft. of gas at 1,863 ft. in Maxon. Same company completed three small gas wells with combined production of 1,320,000 cu. ft. of gas daily.

COMPOUND PUMPS
FASTER!
Costs No More Than Makeshift Devices!
It costs no more to use an American Iron & Machine Works Co. slush pump compounding valve in your hook-up than it does makeshift compounding devices. Yet there is no comparison in the way they work. Because it opens and closes automatically this valve speeds up the compounding of slush pumps.
Simple in Design - Wears Indefinitely!
Thanks to its simple design and ease of operation this compounding valve will last almost a life-time. No sanding-up in the valve can occur. What's more, the seat on this valve is reversible which doubles its life.
AMERICAN
IRON AND MACHINE WORKS CO.
OKLAHOMA CITY, OKLAHOMA
Houston and Monahans, Tex.; Harvey and New Iberia, Louisiana; Great Bend, Kansas. Export office. 420 Lexington Ave., New York City
California Representative:
Hopper Mch. Wks., Inc., Bakersfield, Cal
WE'RE SERVING
UNCLE SAM, TOO
Not only has the American Iron & Machine Works Co. been doing its best to meet the needs of the oil industry, but we've also been up to our ears in war work.

OKLAHOMA

East Pauls Valley Pool Has Three Pay Zones

ALTHOUGH overshadowed by developments at West Edmond, the East Pauls Valley pool in Garvin County has been showing signs of developing into a substantial pool. This week attention was focused on the Garvin County area when Ohio Oil Co. 1 Garvin, NE SE SE 18-3n-3e, flowed 790 bbl. of oil in 4½ hours from the Pennsylvanian through perforations at 2,950-75 ft.

Three pay zones have been found in the pool, a Pennsylvanian sand, the Pennsylvanian chert and the Viola lime. Temporary allowables have been fixed at 150 bbl. per day per well for each zone. So far two wells have been completed in the chert zone, three in the sand zone and one in the Viola, with three more wells scheduled for completion soon. Ohio Oil Co. is expected to file application with the state Corporation Commission for rules and regulations, including permits for dual completions.

The steady increase in operations for the state continued this week, as operators completed 22 oil wells, 3 gas wells and 13 dry holes, for a total of 38 completions, while first reports covered 53 new locations, including 11 new wildcat locations. The eight wildcat completions for the week included formal completion of two extensions to the West Edmond field and six dry holes. The new locations included 13 for West Edmond, but later the Sohio Petroleum Co. announced 21 locations for that field, which are to be drilled by rigs expected to be available this month from a crop of wells now nearing completion.

Sinclair Prairie Oil Co. 1 Theimer, NE SE SW 10-10n-3w, which failed to find oil in the second Wilcox at the West Moore pool, will plug back and test the Hunton lime. This test will be watched closely by those geologists who still maintain there is a possibility of Hunton production extending more or less continuously that far south from the West Edmond field.

OKLAHOMA WILDCAT COMPLETIONS

Garfield County: Frank Buttram 1 Rigorn, NW NW SW 34-24n-4w, dry, TD 5,535 ft., Mayes 5,458 ft.

H. S. Adkins 1 Novotny, SW NW NW 32-24n-3w, dry, TD 1,862 ft.

Kay County: Kan-O-Tex 1 Hansen, NW SW SW 17-26n-2e, dry, TD 3,662 ft., Layton 2,500 ft., Oswego 3,305 ft., Skinner 3,560-90 ft.

Oklahoma County: West Edmond Extension. Continental Oil et al 1 Casey, SW SE 21-14n-4w, 218 bbl. in 24 hours, perforated 250 shots 6,592-6,664 ft., acidized 1,000 gal., TD 6,705 ft., Bartlesville 6,496-6,516 ft., Woodford 6,586 ft., Hunton 6,596 ft., base Bois d'Arc 6,665 ft.

West Edmond Extension: Phillips Petro-

leum 1 Edmond (O'Brien), SW SE 6-14n-4w, 419 bbl. after acidizing with 1,000 gal., pay zone 6,898-6,949 ft., TD 6,955 ft., Woodford 6,842 ft., Hunton 6,896 ft., base Bois d'Arc 6,949 ft.

Pottawatomie County: Coronado Oil and Continental 1 Davis-Tyner, NW NE SW 30-9n-2e, dry, TD 6,128 ft., second Wilcox 6,077 ft.

Stephens County: Magnolia Petroleum 1 Finley Duncan, NE NE SW 31-2s-4w, dry, TD 4,874 ft., base Pennsylvanian and Arbuckle 4,749 ft.

Anderson-Prichard 1 Woods, SW SW NE 26-2s-7w, dry, TD 1,934 ft.

MISSISSIPPI

West Heidelberg Wells May Be in a Separate Pool

JACKSON.—Gulf Refining Co. 2 John Morgan, SE SE 34-1n-12e, in coring and drill-stem tests has located water contact more than 100 ft. lower than in wells on east side of the field, indicating a possible separate pool on the west side. There are now 60 operations in Mississippi, 7 in Alabama, 2 in Georgia and 8 in Florida.

MISSISSIPPI WILDCAT COMPLETIONS

Franklin County: Placid Oil 1 Crosby et al, 3,590 ft. S and 5,067 ft. W of NE cor. 33-7n-1e, dry, TD 10,700 ft.

Jones County: Gulf Refining 1 Masonite "C," NW NE 15-9n-10w, dry, TD 7,341 ft., chalk 4,287 ft., Eutaw 5,360 ft., Marine Tuscaloosa 6,592 ft., Massive 7,008 ft., lower Cretacious 7,149 ft.

Smith County: Exploro Corp. 1 Stringer,

LEGAL

LEASE OF OIL AND GAS PRIVILEGES ON STATE REFORESTATION AREA LANDS, ALLEGANY COUNTY

Sealed bids for the leasing of the right to prospect, extract, pipe, store and remove oil and natural gas from 1862.40 acres of State reforestation area lands in Allegany County, more particularly described as Allegany Reforestation Area No. 7, Proposals A, B, C, D, E, F, H, I, J, and L, total 1136.58 acres, and Allegany Reforestation Area No. 20, Proposals A, B, C, D, and E, total 725.82 acres, located in the towns of Amity and Ward, Allegany County, will be received at the office of the Conservation Commissioner, 488 Broadway, Albany, N. Y., until 2:30 P.M., Eastern War Time, on August 25, 1944.

Bids must be submitted in sealed envelopes endorsed on the outside with the name of the bidder and the following: "Proposal for oil and gas privileges on State lands in Allegany County, N. Y., to be opened at 2:30 E.W.T., August 25, 1944."

These privileges will be leased to the highest bidder in accordance with the terms of Section 60-b of the Conservation Law and of the standard oil and gas lease of the State of New York. Copies of this lease will be furnished to prospective bidders upon application. Official maps of the Conservation Department showing the location of the lands to be leased may be seen at the office of the Conservation Department, 488 Broadway, Albany, and at the office of District Forester I. S. Bowlby, 34 Liberty St., Bath, N. Y.

Bidding for these privileges will be upon the royalty per thousand feet for gas, in addition to which an annual rental of 25c per acre will be required and also one-eighth of the market value of any oil produced. Bids must be accompanied by a certified check or cash deposit in the amount of the annual rental, which will be credited to the successful bidder upon execution of the lease. Deposits of unsuccessful bidders will be returned. Successful bidders will be required to give a bond of $5,000 for faithful performance of the terms of the contract. The Conservation Department reserves the right to reject any and all bids.

Standco INDUSTRIES

STANDCO BRAKE LINING CO.
"Drillers Prefer Standco"

STANDCO BOLT CO.
Standco PRECISION BOLTS

FOR HELPFUL, COOPERATIVE FIELD SERVICE, *Call*

Pacific Coast
J L.. Cadwallader, Mgr.
2411 South Main, Los Angeles, Calif.
Phone: Prospect 6428
J. C. Joy, Service Engineer
Bakersfield, California
Phone: 28131

Rocky Mountain District
L. E. Van Winkle, Service Engineer
20 North 34th Street
Billings, Mont.

West Texas-New Mexico District
B. W. (Steve) Stevens,
Service Engineer
Wellsmans Warehouse
Odessa, Texas
Phone: 633

Oklahoma-Kansas District
Hugh Robinson, Service Engineer
Blackwell, Okla.
Phone: 923

Southwest Texas District
Otis (Jack) Pyles, Service Engineer
2210 Leopard St.,
Corpus Christi, Texas
Phone: 5078

Gulf Coast-Central Texas District
Fred A. Turner, Service Engineer
2701 Clinton Drive
Houston, Texas
Phones: Day Fairfax 5346; Night L-1265

Southeast Texas-Louisiana-Mississippi Gulf Coast
A. S. (Andy) Herron, Service Engineer
1108 3rd St.,
Lake Charles, La.
Phone: 4677

North East Texas-Northern Louisiana-Northern Mississippi and Arkansas District
W. H. Ward, Service Engineer
417 Lake Street
Shreveport, La.
Phone: 2-6273

Tri-States and Michigan District
C. B. Holder, Service Engineer
Box 493, Mt. Vernon, Ill.
Phone: 2-224

Eastern District
R. C. (Bob) Swaney, Mgr.
64 Wilkins St.
Hudson, Mass.
Phones: Day 67-W; Night 134-M

More deep wells have been drilled with Standco than all other blocks combined.

Heat Treated Steel Bolts and Nuts of high tensile alloy steel for refinery, high octane, and rubber plant applications.

STANDCO INDUSTRIES
GENERAL OFFICES:
2701-2801 Clinton Drive HOUSTON, TEXAS
PLANTS:
Houston, Texas. Gleasondale, Mass. Los Angeles, Calif.

SW NW SE 5-10n-13w, dry, TD 1,730 ft.

Southport Petroleum 1 La Rue, NE NE 10-1n-9e, dry, TD 7,753 ft., Selma 5,031 ft., Eutaw 6,276 ft., Tuscaloosa 6,740 ft., Marine Tuscaloosa 7,568 ft. Did not reach Massive sand.

Yazoo County: Vaughey & Vaughey 1 Ray, NW SW 24-11n-2e, dry, TD 6,660 ft., chalk 4,210 ft., Eutaw 5,141 ft., Tuscaloosa 5,875 ft., Marine Tuscaloosa 6,236 ft., Massive 6,539 ft., Lower Cretaceous 6,597 ft.

Plains Production et al 1 Kind, SE NW 29-12n-1e, dry, TD 7,316 ft., Selma 4,725 ft., Eutaw 5,595 ft., Tuscaloosa 6,230 ft., Marine Tuscaloosa 6,706 ft.

SOUTHWEST TEXAS

Northeast Brooks Test Showing for Producer

CORPUS CHRISTI.—Eight miles east of Falfurrias, northeast corner of Brooks County, Sun Oil Co. 1 Sullivan et al, ran drill-stem test from 8,510-17 ft. and recovered 21 stands of oil, 2 stands of oil and mud, with 4-lb. working pressure, through ¼-in. chokes, in 20 minutes. Total depth is 8,517 ft., and casing has been set.

Sun 1 Santa Rosa, Inc., deep test on Share 44, San Juan de Carricitos grant, 8 miles southeast of Raymondville, is reported dry after running a series of tests which failed to indicate commercial production. Test in perforations at 7,036-42 ft. had some oil. Total depth of the hole is 11,520 ft., with 9⅝-in. casing set to 5,095 ft., and 5½-in. casing at 8,042 ft.

Kingwood Oil Co. 1 M. F. Bass, wildcat, in Lot 6, Range 11, Victoria townsite, 2 miles south of Victoria, drilled to about 5,000 ft. and then blew out from a shallower sand.

In Mineral field area, Bee County, H. B. Zachry et al 1 Mary Elizabeth Page et al, is preparing to drill plug from 7-in. protection casing set to 8,048 ft., but if nothing better is encountered in deeper zones, completion will be made in the gas-condensate sand at 7,900-21 ft.

Arkansas Fuel Oil Co. 3 F. F. Martinez, Survey 79, 1,320 ft. east of No. 2 well, at North Rincon field, Starr County, perforated with 12 holes from 4,259-61 ft. and 72 holes from 4,240-49 ft., and is setting 2-in. tubing at 4,241 ft. for a production test. Drill-stem test at 4,259-69 ft., using ¼-in. chokes, developed 175 lb. pressure and recovered oil with 210 ft. of water. Total depth is 4,315 ft. with 5½-in. casing set on bottom.

SOUTHWEST TEXAS WILDCAT COMPLETIONS

Bee County: Windsor Oil Co. 1 Clark Wood, 10 miles W of Woodsboro, Jas. McGeehan Sur., dry at 5,828 ft.

Bastrop County: Marts & Beaven 2 W. B. Bryant et al, J. M. Bangs Sur., Abst. 5, 6 mi. NW of Bastrop, dry at 2,365 ft.

De Witt County: Arkansas Fuel Oil Co. 1 W. F. Buehrig, Cottonwood Creek discovery, 3 mi. NW of Myersville, in J. F. Kemper Sur., TD 7,700 ft., perf. 69 at 7,625-35 ft., gas-condensate, no gage, gravity 55°.

Guadalupe County: H. R. Cullen et al 1 San Antonio Loan & Trust Co., Inc., John A. Miller Sur., 12 mi. SE of Seguin, dry at 4,060 ft.

Jim Hogg County: M. L. Massingill and William E. Spice, Jr. 2 John H. Allen and C. W. Hellen, H&GN Sur., Abst. 186, 12 mi. SW of Hebbronville, dry at 3,184 ft.

Live Oak County: Argo Oil Corp. 1 T. M. Brookshire, J. Poitevent Sur., 4 mi. S of Clegg, dry at 3,905 ft.

Webb County: Chas. E. Fraser, Inc. (447) A. M. Bruni estate, South Bruni discovery, C&M Sur. 447, Abst. 975, 6 mi. S of Bruni, TD 1,812 ft., perf. 18 at 1,810-12 ft., flowed 120 bbl. day open 2-in. tubing, 3 per cent salt water, TP 20 lb., CP 265 lb., shut in 5 days, reopened and flowed dry gas, no oil, TP and CP 400 lb., shut in.

Sohio Petroleum Co. 1-A Callaghan Land & Pastroal Co., 19 mi. SE of Encinal, CCSD&RGNG Sur. 1339, dry at 7,231 ft.

Willacy County: Sun Oil Co. 1 Santa Rosa, Inc., San Juan de Carricitos grant, 8 mi. SE of Raymondville, dry at 11,520 ft.

LA.-ARK.

Six New Wells Started In Monroe Gas Field

SHREVEPORT.—There were only 8 completions in northern Louisiana and 3 in Arkansas this week, but 14 new operations were reported in Louisiana, including 6 new starts by the Interstate Natural Gas Co. in the Monroe gas field, and a wildcat in Sabine Parish, Lyons & Prentiss 1 Four "L" Co., in 25-6n-12w.

Four new operations were announced for Arkansas, including wildcats in Calhoun, Nevada and Union counties.

ARKANSAS WILDCAT COMPLETION

Nevada County: Placid Oil 1 Silvey, SW SE 14-14s-22w, dry, TD 5,610 ft.

NORTHERN LOUISIANA WILDCAT COMPLETION

La Salle Parish: Placid Oil 1-F Tremont SW SW 14-9n-2e, dry, TD 12,000 ft.

Is the Scarcity of Pipe and Drilling Equipment Shutting Your Rig and Operations Down?

IF SO, WHY NOT CALL ON US

Alice Pipe & Supply Co.

SAN DIEGO ROAD — ALICE, TEXAS

THE BIGGEST DEALERS IN RECONDITIONED DRILLING EQUIPMENT AND PIPE IN THE MID-CONTINENT AREA

RIGS—STEAM OR POWER
DRILL PIPE
STEAM DRILLING ENGINES
POWER PUMPS
BLOW-OUT PREVENTERS
SWIVELS
ROTARIES
DRILL COLLARS
CROWN BLOCKS
TRAVELING BLOCKS
DRAW-WORKS
GAS OR GASOLINE ENGINES
TOOL JOINTS
BOILERS

Everything for the Oil, Gas or Water Well Bought and Sold

A Complete Line of Rental Pipe and Tools

ASK TO BE PUT ON OUR MAILING LIST

JOE GLEASON, Owner

WIRE OR PHONE 619 OR 620, ALICE, TEXAS • WE SHIP ANYWHERE

SAVES MANPOWER!

Norris Clutch Type Valve Puller Eliminates Extra Pulling of Rods To Pull Lower Valve . . .

This is no time to *waste* precious manpower. This is an emergency that calls for the *conservation* of labor and the *saving* of time—and in pumping wells such a policy demands the use of the Norris Clutch Type Valve Puller. As part of your pumping string, this performance-proved device does *not* retard production or emulsify the oil. But it *is* ready at a moment's notice to pull the standing valve quickly, safely, positively, thus *saving* the extra run of the rods and the time and labor it involves. Desirable in peace, essential in war, it belongs in all pumping wells.

Norris Brothers, INC.
ROBINSON · ILLINOIS

SOUTH LOUISIANA

Cankton Field Gains Second Oil Producer

NEW ORLEANS.—Sun Oil Co. 1 Laurent Patin, 48-8s-4e, the second well in the Cankton field, St. Landry Parish, south of the discovery, flowed potential of 210 bbl. per day on ½-in. choke, gas-oil ratio 952:1, tubing pressure 1,700 lb., gravity 34.7°, 0.1 per cent water, through 18 performations at 9,709-13 ft. Total depth 9,803 ft. with casing set on bottom. This well is producing from the same sand as the discovery, and is some lower structurally.

Official gage shows Continental Oil Co. and Standard Oil Co. of Kansas 2 Standard of Kansas fee, 137-10s-6e, new sand discovery on the north flank of St. Martinville dome, St. Martin Parish, as flowing 39 bbl. daily on 10/64-in. choke. Gas-oil ratio was 56,645:1, gravity 51.8°, tubing pressure 3,550 lb., casing pressure 3,750 lb., no water, from perforations at 9,734-44 ft. Total depth in the sidetracked hole is 9,950 ft. with 7-in. casing set at 9,396 ft.

Continental is preparing to spud 1 King Corp., 7 miles northeast of the Iowa field, Jefferson Davis Parish. This wildcat is on a prospect previously drilled by J. K. Lewis 1 Lock-Moore, Section 32, to 7,095 ft., and R. M. Bleakie 1 Lock-Moore, Section 29, to 7,500 ft. The Continental well is about 1 mile north and west of previous tests, which were not considered deep enough to explore the whole geological section.

SOUTH LOUISIANA WILDCAT COMPLETIONS

Cameron Parish: Continental 1 State-Calcasieu Lake, Lse. 50, Calcasieu Lake dome, 1-14s-9w, in Lake, dry at 7,802 ft.

St. James Parish: Humble Oil & Refining Co. 1 Mrs. Rosa Roussell Keller et al, College Point discovery, 31-12s-4e, TD 10,893 ft., 35 perforations at 10,758-65 ft., PT 8.56 bbl. hour, ¼-in. choke, gas-oil ratio 10,617:1, TP 5,175 lb., SI TP 5,500 lb., gravity 46.5°, no water.

PERMIAN BASIN

Deep Howard County Test Logs Gas Show

MIDLAND.—Northern Ordnance, Inc. 1 J. C. Spauling, wildcat in Section 7, Block 33, T-2-N, T&PRR Survey, northwestern Howard County, recovered 780 ft. of gas-cut drilling fluid on a 96-minute drill-stem test at 5,100-91 ft., reportedly in the Strawn section of the Pennsylvanian formation. Prior to testing, it had lost circulation at 5,120-25 ft., then cored from 5,128-91 ft., recovering lime and shale with pin-point streaks of porosity showing gas and carrying a slight odor of oil. It is drilling ahead, with contract depth of 7,000 ft.

Mitchell County.—Warren Petroleum Co. is preparing to drill 1 Chester L. Jones, in northwestern Mitchell County, to explore the lower Permian zones, with projected depth of 5,500 ft. Location is 467 ft. out of the southeast corner of Section 9, Block 26, H&TCRR Sur., about 4 miles east of the Vincent pool.

Pecos County.—Phillips Petroleum Co. is preparing to start an 11,000-ft. Ordovician wildcat in northwestern Pecos County 9 miles northwest of Fort Stockton. The test will be 1 Powell estate, 660 ft. from south and 4,441 ft. from west lines of Section 3, TMRR Sur., being 1 mile northeast of the old shallow Pryor-Courtney area.

Andrews County.—Mid-Continent Petroleum Corp. 1-7 University, wildcat in Section 20, Block 13, south of the Fullerton pool, was preparing to run 7-in. casing at 8,941 ft. in brown lime, and apparently will make a production test of the promising zone at 8,470-8,670 ft., believed to be the Wolfcamp formation, which indicated commercial production on a drill-stem test about 2 weeks ago. Occurrence of oil in this zone has indicated broad possibilities for production from the same strata below the regular pay zone in the big Fullerton field.

Gages have been reported on two new wildcat producers in Andrews County, both of which have been in process of completion for several weeks. Phillips 1-H University, Section 37, Block 9, 3 miles northwest of the North Cowden field, swabbed 161 bbl. of oil in 24 hours

(Continued on page 108)

through tubing after using nitro shot on pay between 4,605-96 ft. The Texas Co. 1 Patillos, 4 miles northwest of the town of Andrews, in Section 22, Block A-36, PSL Survey, registered pumping potential of 72 bbl. daily at total depth of 4,414 ft., after nitro shot.

Winkler County.—Gulf Oil Corp. 46-E Keystone, in Section 6, Block B-2, PSL Survey, a 1½-mile southeast extension to the Keystone Ellenburger pool, flowed at rate of 52 bbl. of 43.5-gravity oil per hour on drill-stem test at 9,897-9,927 ft. It had previously logged pays above this zone. Amon Carter and Pure Oil Co. 5-C Walton, same pool, has been completed in Ellenburger pay from 9,535-9,875 ft., total depth, flowing 1,568 bbl. daily through ½-in. tubing choke.

WEST TEXAS WILDCAT COMPLETIONS

Lynn County: Phillips Petroleum Co. 1 Bartley, 660 ft. from N and W, Sec.

(Continued on page 108)

LEGAL

Notice of Oil & Gas lease sale: The U.S. Department of Agriculture will award leases on 15 tracts of approximately 2480 acres in Cochran County, Texas, on former Slaughter Ranch. Rent $1.00 per acre. Awards limited to 1 tract per lessee. Sealed bids to be publicly opened September 15. Bid forms and additional information can be secured from Ray E. Davis, Acting Regional Director, Farm Security Administration, Old Post Office Building, Amarillo, Texas. Permission may be obtained from Mr. Davis for making preliminary geophysical and geological surveys upon written request.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, Washington, D. C., Notice is hereby given that the lands herein described within the known geologic structure of the Lamb Anticline gas field, Wyoming, are offered to the responsible qualified bidders of the highest cash bonus per acre for lease under section 17 of the mineral leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. sec. 226), in the following parcels: Parcel No. 1, T. 51 N., R. 93 W., sec. 7, lot 8, 50.64 acres; Parcel No. 2, T. 51 N., R. 93 W., sec. 7, E½ lot 15, sec. 18, lots 5, 6, 9, 10, 11, 12, 15, and 16, 340 acres; Parcel No. 3, T. 51 N., R., 93 W., sec. 18, lots 7, 8, and 13, T. 51 N., R. 93 W., sec. 13, E½NE¼, NE¼SE¼, 272.39 acres; Parcel No. 4, T. 51 N., R. 93 W., sec. 13, W½NE¼, NE¼ NW¼, SE¼NW¼, 200 acres; Parcel No. 5 T. 51 N., R. 93 W. sec. 11, SE¼NE¼, E½SE¼, sec. 12, SW¼NE¼, S½NW¼, N½ S½, 400 acres. Parcel No. 6, T. 51 N., R. 93 W., sec. 1, S½SW¼, sec. 2, SE¼SE¼, sec. 11, NE¼NE¼, sec. 12, NW¼NE¼, N½NW¼, 280 acres. Sealed bids will be received in the office of the Secretary of the Interior, Interior Building, Washington 25, D. C., up to twelve noon August 7, 1944. Bids must be submitted on each parcel separately, but if two or more parcels are awarded to the same bidder they may be combined in a single lease provided the acreage does not exceed 640 acres. Each bidder must submit a certified check or cash for one-fifth of the amount bid payable to the order of the Treasurer of the United States and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid, and a $5,000 corporate surety bond must be furnished by the successful bidder prior to the issuance of the lease. The deposits of the other bidders will be returned. The envelopes should be plainly marked 'Bid for Parcel No. ——, Lamb Anticline gas field. Not to be opened before noon August 7, 1944." No bids received after the time fixed herein for submitting bids will be considered. The successful bidders will be required to agree not to discriminate against any employe or applicant for employment because of race, creed, color, or national origin and to require an identical provision to be included in all subcontracts. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Fred W. Johnson, Commissioner.

TORSION BALANCE

("Old Faithful")

Dr. Donald C. Barton wrote of the "Brilliant Record of TORSION BALANCE"

To Oil Men: The Records show that from 1923 to 1939 torsion balance primarily discovered over 125 of our most prolific Oil Fields of Texas and Louisiana and many more remain to be discovered and, we have what it takes to discover them for you. You have used every other geophysical method; have YOU used TORSION BALANCE? Torsion balance can operate efficiently wherever any other geophysical instrument can. It can explore about 10,000 acres per month at a cost of around $3,000, and it is not hampered in its accuracy by thick sands and gravels, alluvium, or thick lime and chalk beds. It can operate effectively in prairie, hills, timberland, swamp or seamarsh. Torsion balance strains out interference of adjacent anomalies and salt masses and, corrects for shifts. Because of accurate gradients with directional arrows and scientific interpretation, domes and structures are now contoured. We have experienced field crews. For further information, phone us at Charter 41926.

Iden & Williams

TORSION BALANCE CONTRACTORS

Christian Iden, Gravity Interpreter — 1740 Commerce Bldg., HOUSTON, TEXAS — James P. Williams, Manager

Geophysical Transformers

Sealed against sub-tropical humidity—"Sextuplex Shielding," improved uniformity, minimum size and weight, *plug-in terminal block.

*Also available with terminal lugs.

GEOPHONE CABLE

Full Line of Geophysical Electronic Supplies

All types Burgess batteries and Agfa developer and hypo in stock for immediate delivery.

HARRISON EQUIPMENT COMPANY

1422 SAN JACINTO — P. O. BOX 2123 — HOUSTON 1, TEXAS

Butch was a good driller but strictly on the superstitious side. He used a pet Chinese rabbit's foot to keep his holes clean only the last time it didn't work on account of it was a Chinese holiday and a packer got all tore up and stuck. The Boss was superstitious about packers—or maybe it was a formation tester—getting stuck and fired Butch and ordered a Baker Rotary CASING Scraper which does the work a lot better than a rabbit's foot. For cement sheaths, burrs from gun-shot holes, and paraffine—the Scraper gets 'em all.

BAKER
ROTARY CASING SCRAPER
BAKER OIL TOOLS, INC.

WEIGHT INDICATOR POINTS

GET FULL DRILLING INFORMATION

When you install a "Sealtite" it indicates and records weight on bit, mud pump pressure, and torque in drill pipe. Rotary table speed is indicated and recorded so you know you're drilling a better well at less cost. This master drilling instrument really controls operations instantly, accurately *at all depths on any well.*

MARTIN-DECKER CORP.
LONG BEACH, CALIFORNIA
A P. McQUISTON, BAKERSFIELD, CALIFORNIA
REED ROLLER BIT CO., HOUSTON, TEXAS

Among the

Drilling Contractors

Nelson Drilling Co., Hutchinson, Kans., has received from Winkler-Koch, Wichita, the contract for 1 Stein, NE NE SE 9-18-1w, in the Paden pool of McPherson County, Kansas.

Delta Drilling Co., Evansville, Ind., got a dry hole at 1 Buckman, which it drilled for its own account in northern Union County, Kentucky. The hole was carried to 2,722 ft.

Perry, Busk & Ormiston will drill for Clifford A. Perry, Grand Rapids, 1 John Pieper, a wildcat, in NW NW SE 30-1n-15w, Fillmore Township, Allegan County, Michigan.

Crescent Drilling Co., Monroe, La., has been awarded the contract to drill a deep test for Shell Oil Co., Inc., in Jackson Parish, Louisiana. The location for this test, 1 Tremont Lumber Co., is 660 ft. north and 660 ft. west from the SW cor. 22-15-1. It is planned as a 9,000-ft. operation.

Big West Drilling Co., Dallas, has completed two gas-distillate wells, drilled for its own account, in the Lisbon field, Claiborne Parish, Louisiana. Its 1 C. S. L. Patton, total depth 8,657 ft., gaged 45,000,000 cu. ft. of gas, with distillate spray. It is in 1-20-5. Big West's 1 Tanner unit, in 14-21-4, drilled to 5,143 ft., was making 35,000,000 cu. ft. of wet gas.

Gordon Oil Co., Mount Pleasant, Mich., is the contractor on 1 Vernal Davey et al, in the C SE 36-17n-8w, Evart Township, Osceola County, Michigan, for National Utilities Co. of Michigan. The location is in the Fork field.

Halko Drilling Co., Shawnee, Okla., has the contract for Charles Balph and associates 1 Meadors, which last week was showing for a producer in the Gilcrease sand zone south of the Papoose pool, in Hughes County, Oklahoma. The well, in SE NW SE 14-9n-9e, was drilled to 3,325 ft., to find the Cromwell zone dry. Plugged back to test the Gilcrease at 2,777 ft., it was bailing out 2 to 4 bbl. of oil an hour, along with gas estimated at 1,500,000 cu. ft. a day. The location is on a small block assembled early this year.

Johnston-Park Drilling Co., Longview, Tex., will drill a wildcat for Lyons & Prentiss seeking production in NE NW 26-6n-12w, Sabine Parish, Louisiana. The test, 1 Louisiana Long Leaf Lumber Co., is expected to go to 3,800 ft. and may be carried to 4,500 ft.

Herndon Drilling Co., Tulsa, has finished 2 Phillips, in the Stoltenberg pool, Ellsworth County, Kansas, rated at 477 bbl. of oil daily from the Arbuckle at 3,276 ft. The well, drilled for its own account, is in 34-16-10w.

E. E. Cunningham, Louisa, Ky., drilling contractor, recently drilled a 190,000 cu. ft. gas well for the Warfield Natural Gas Co. on Federal Land Company tract on Little Lick Branch in Martin County, Kentucky, and now is drilling another well for the same company on Grassy Creek in Martin County.

San Joaquin Drilling Co., Bakersfield, Calif., will drill an outpost well in the Lanare district of Fresno County for Amerada Petroleum Corp. on California Lands Co. in 15-17s-18e.

Bender Drilling Co., Howard Drilling Co., Stansberry & Stansberry, George Terry, Buaas Drilling Co., B. M. F. Drilling Co., Hoover Drilling Co., and **Tracy Harkness**, California contractors, each have one or more rigs assigned to the Elk Hills development program which contemplates ultimate completion of 300 new wells.

Pacific Drilling Co., Los Angeles, has been granted contract to drill a wildcat in the La Jolla district of San Diego County, California, for La Jolla Petroleum Co. This test well will be drilled in 32-15s-3w.

Killingsworth Bros., Los Angeles drilling contractors, are preparing to spud 4 Santa Fe in the Wilmington field for V. R. G. Wilbur, independent operator who has production in several fields.

MARKET QUOTATIONS

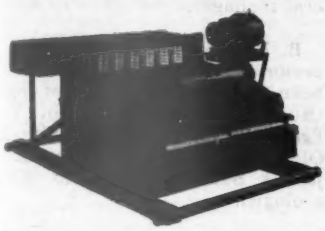
Prices as of August 1, 1944

(This service is abbreviated because most refinery products are selling at the Government's price ceilings. Quotations on other products than those shown here furnished on request. Quotations are f.o.b. plant in tank cars and in cents per gal-

REFINERY GASOLINE

Octane (A.S.T.M.):	80†	72-74
Mid-Continent	6.00-6.25	5.750-6.000
Gulf Coast	6.00-6.50	‡5.750-6.250
Northeast Coast	9.00	9.200

McNEELY VIBRATING MUD SCREEN



Handles the output from 20" mud pumps after surface hole is drilled. Average capacity 650 gallons per minute. Completely unitized. Screening surface—16 square feet. Domestic shipping weight less drive—1600 pounds. Headroom—27 inches. See Composite Catalog or write for details.

VERNON TOOL CO., LTD.
1101 MERIDIAN AVENUE,
ALHAMBRA, CALIF.
GULF COAST AND MID-CONTINENT REPRESENTATIVE
McNEELY MATERIALS CO.
2935 JENSEN DRIVE, HOUSTON, TEXAS

California	6.255-6.500

*Basis Oklahoma Group 3. †1836 C.F.R. (research method.) ‡Unleaded.

NATURAL GASOLINE

Grades:	28-70	18-55
Oklahoma (Group 3)	4.750	5.700
North Texas	4.375	5.250
North Louisiana	4.375	5.250
California	4.875	5.500

CRUDE-OIL PRICES

Representative posted schedules per bbl.	
East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas	1.08

Note: Exclusive of subsidy.

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Okla-homa, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT

Week ended July 22, 1944
(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gaso-line	Stocks: Resid-ual	Stocks: Gas oil
Appalachian	158	3,865	497	750
Ind., Ill., Ky.	797	18,756	3,966	5,288
Okla., Kan., Mo.	374	6,860	1,596	1,606
Censored area*	2,439	36,274	16,323	20,759
Rockies	115	2,334	640	943
California	801	14,061	32,293	8,767
Total 7-22-44	4,684	82,150	55,315	37,513
Total 7-15-44	4,575	82,252	54,332	37,171
Total 7-24-43	3,954	74,356	67,161	33,863

*Reports combined on East Coast, Texas Gulf Coast, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
July 22, 1944	225,294,000
July 15, 1944	226,513,000
July 24, 1943	237,279,000

*Excludes unrefinable in California stocks.

B and W, Inc.

Wall Cleaning Guides

Prevent Cement Channeling

BRUCE BARKIS — B and W, Inc. — KENNETH WRIGHT

Well Completion Specialists

WEST COAST: 3545 Cedar Avenue
Long Beach, Calif. • Phone: L. B. 4-8366
GULF COAST: 305 M & M Building
Houston, Texas • Phone: Preston 9783

CALENDAR

September

A.C.S., 1944 fall meeting, Pennsylvania Hotel, New York, September 11-15.

N.P.A., annual meeting, Hotel Claridge, Atlantic City, N. J., September 20, 21, 22.

October

C.N.G.A., annual meeting, Biltmore Hotel, Los Angeles, October 13.

RECTORSEAL DOES THE JOB

No Other Leak Preventer Will Do

RECTORSEAL is made especially for the oil industry, by men who know oil industry problems, to put an end to all costly gas, steam, water, oil and mud line leakage.

It can be applied in a hurry, seals instantly, and breaks out easily due to its natural lubricating quality.

RECTORSEAL is insoluble in all petroleum products, is not affected by salt water or dilute acids or steam up to 400 degrees F.

Get RECTORSEAL from your nearest supply store. Be sure to ask for it by name.

A product of Rector Well Equipment Co., Inc., Fort Worth and Houston, Texas.

Export: Lucey Export Corp., Woolworth Bldg., N.Y.C.

RECTORSEAL
THE POSITIVE LEAK PREVENTER

Qualified for Oil Field Use!

No. 50H-J, capacity 50-tons. Two pumps, high and low speed, can be operated singly or in unison. No. 30H-J, same design, capacity 30-tons. Single pump types: 3, 5, 8, 12 and 20-tons.

The Simplex Line of hydraulic jacks now covers the full range for lifting or moving heavy loads. Minimum closed height and maximum lift are provided in all sizes. The ruggedness, speed and safety of every size commend them for oil field use. New Catalog 44.

Simplex
LEVER · SCREW · HYDRAULIC
Jacks

Templeton, Kenly & Co.
Chicago (44), Illinois
Better, Safer Jacks Since 1899

PERSONALS

Dickey Didn't Take Flying Leap Into Oil Business

GEORGE P. DICKEY, president of The Dickey Oil Co., Wichita, Kans., didn't take a flying leap into the oil business. He experimented with several occupations, most of them on the outskirts of petroleum, before emerging as a full-fledged oil man. Born in Dorchester, Mass., in 1887, he learned the carpenter's trade, worked as an oil-field building contractor, lease broker, salesman for oil equipment houses, and in 1926 formed Dickey Drilling Co.

On a farmout deal with Shell Oil Co., Inc., he opened the Robbins pool, south of Wichita, in 1929. Two years later he brought in a well on his Decker lease in the Ritz-Canton field, Kansas, which produced 14,326 bbl. of oil in 24 hours. With no outlet for some of his Ritz-Canton production, he solved the problem by building his own refinery at McPherson, nearby. He operated his own marketing and tank-car systems. In 1937 he sold the refinery, with its marketing division, to Bay Oil Corp.

Since that time Dickey has devoted his attention to building up oil production. He was one of the leading operators in the Burnett pool, Kansas, where his company has 58 wells. The company, organized in 1933, has 15 wells in the Lindsborg pool, Saline County. It was among the early operators in the Edmond pool, Oklahoma. When Dickey finds time for relaxation he gets it by hunting and fishing on his 7,000-acre ranch, near Grand Lake, Colo.

Albert E. Pierce, Tulsa, general manager of production for Mid-Continent Petroleum Corp. since August 1943, was made vice president in charge of production. Pierce, who joined Mid-Continent in 1920, has wide experience as driller and oil producer.

B. R. McHenry has joined Gulf Oil Corp. in Tulsa as a special assistant to **S. G. Sanderson,** general superintendent of production. McHenry formerly was director of industrial and adult education in the Tulsa public school system.

Frederick Swank, formerly employed at the Belleville, Ohio, branch of National Cooperative Refinery Association, has been made manager of a new branch established at Shiloh, Ohio.

William E. Glover has been appointed assistant to the transportation manager of Ashland Oil & Refining Co., Ashland, Ky. He is in charge of dispatching river, rail and truck shipments and coordinating crude-oil supply with refinery requirements and transportation facilities.

Louis Waterfall, assistant chief geologist for Union Oil Co., has been appointed head of the department, succeeding **Earl B. Noble,** who has been placed in charge of all outside exploration.

E. W. Galliher, Barnsdall Oil Co., Los Angeles, has returned to California after inspecting a number of oil prospects in the vicinity of Calgary, Canada.

P. F. Shannon, recently elected president of the Royalite Oil Co. of Calgary, succeeding to the late J. H. McLeod, has been appointed a director of the Alberta Petroleum Association.

Robert Siddall, formerly scout for Atlantic Refining Co. in West Texas, has been transferred to San Antonio. He is succeeded at Midland by **David Black,** shifted from Amarillo.

Capt. Charles R. Wheeler, Oil City, Pa., has been named field service representative of Pennsylvania Grade Crude Oil Association, with headquarters in Chicago. Captain Wheeler commanded a tank-destroyer battalion in Africa. He was wounded in a mine explosion at Sidi Bou Zid and was discharged from service last January.

Ronald M. Craigmyle was named president and treasurer of Southwest Natural Gas Co. at the recent annual meeting. **R. H. Curry** is general manager.

R. B. Paxson, formerly with Superior Oil Corp. in Houston, has been made chief geologist of Sunray Oil Corp., with offices in Tulsa. **Frank Bowser,** formerly with Lion Oil Refining Co. in Kansas, has joined Sunray as Kansas district geologist.

George A. Weaver, geologist for Pure Oil Co., has been transferred from the Fort Worth office to Tyler as district geologist for East Texas.

Lt. Cecil Hagen, who was a consulting geologist in Houston, has been made commander of the training squadron at the U. S. Naval Air Station at Dallas.

Joseph Herring, B. & H. Oil Co., Columbus; **Paul Stone,** Fitzgerald; **Reginald Trice,** Macon, and **John LeGreve,** Albany, are the new directors of Georgia Independent Oil Men's Association, elected at the annual meeting, held in Macon. The board membership was increased from 6 to 10. Officers chosen are: **R. W. Jones,** Macon, president; **C. W. Skinner,** Waynesboro, first vice president; **T. G. Reeves,** Columbus, second vice president; **Frank A. Dennis,** Evanston, secretary-treasurer; **R. W. Gober,** Macon, executive secretary-treasurer.

Evan Just, formerly an engineer for The Carter Oil Co. in Oklahoma City and Seminole, Okla., and who recently has been associate editor of Engineering and Mining Journal, has been made editor of that publication.

Addison Young, for several years a consulting geologist in the West Texas-New Mexico area, has joined the Phillips Petroleum Co.'s organization in that district as research geologist, with headquarters in Midland. **Gilbert Brown** is a new member of the Phillips staff there.

Equipment Progress

B. F. Fallon Organizes Mid-Coast Sales Co.

Bernard F. Fallon, who recently resigned as executive vice president of one of the largest independent refining companies in the Houston area after an association of more than 10 years, has now organized his own company — the Mid-Coast Sales Co.—to act as a manufacturer's agent.

Fallon has had experience of more than 20 years in refining and industrial engineering, construction, purchasing, sales and administrative work.

After spending several years in the drafting room of outstanding engineering concerns, he aligned himself with one of the major oil companies in engineering department both in Massachusetts and New York. From the engineering department he passed through the various steps of maintenance supervision, purchasing and sales work. In 1933 he joined a group organizing an independent refining company.

He resigned from the refining company in early 1943 to engage in his own activity—The Mid-Coast Sales Co., now having exclusive marketing rights in the states of Texas, Louisiana and Oklahoma for heat exchangers and special equipment for Petro-chemical industries as manufactured by the Patterson-Kelley Co., Inc., of East Stroudsburg, Pa.

The Patterson-Kelley Co. was organized in 1880 and since that time has won recognition as manufacturers of heat-transfer equipment. The company maintains an engineering department available at all times to assist manufacturers in heat-transfer design and construction problems.

Offices of the Mid-Coast Sales Co. are in the Esperson Building, Houston, Tex.

Tulsa Firm in New Location

The Alloy Welding & Manufacturing Co. has moved its offices to 831 Xanthus Place, Tulsa. This firm was formerly located at 109 West Archer. J. A. Looney, J. E. Looney, and H. W. Moore are the three principals and owners of the business which specializes in the metal lining of valves which enables them to withstand hydrofluoric and hydrochloric acids.

Double Trunnion Tilt Dozer Announced

A new cable-controlled side-lift bulldozer and trailbuilder featuring single king pin mounting of the moldboard and double trunnion tilting has just been announced by The Buckeye Traction Ditcher Co., Findlay, Ohio. The moldboard of the trailbuilder can be angled to the right or left on the single king pin simply by removing two landside pins, swinging the blade to the desired side, and replacing the landside pins which hold it rigidly in place. The double trunnion mounting makes it possible to tilt either end of the blade 12 in. by attaching one push arm to the top trunnion on one side while the other arm is mounted on the lower trunnion on the opposite side.

The horn and push frame which have been completely redesigned are fabricated from heavy steel welded boxbeams to provide maximum strength. The rugged construction of the moldboard is another of the exceptional features of the new dozer. Welded V-shaped vertical braces and heavy steel plate horizontal crosspieces reinforce the blade so that it can withstand the toughest bulldozing operation. Moldboard is fitted with reversible cutting edge and replaceable corner bits.

The new dozer is track mounted with the weight evenly distributed over the crawler shoes to provide maximum traction. Single or double drum Buckeye power control units provide the necessary power.

Owings Rejoins Youngstown Sheet & Tube Co.

Announcement has been made of the resignation of Jay W. Owings, deputy chief, pipe branch, steel division, War Production Board, for the past 2 years, to rejoin Youngstown Sheet & Tube Co. as assistant manager of tubular sales.

Owings was with the Youngstown Sheet & Tube Co. for 14 years before joining WPB, spending 8 years in the metallurgical department and 6 years in field service. He was superintendent of field engineers of the tubular division just before joining WPB.

J & L Names Baker

Jones & Laughlin Supply Co. announces the appointment of Seymour S. Baker as district representative of the engineering and construction division, for the Gulf Coast area, with headquarters in Houston.

Baker has been continuously associated with design and construction activities in the petroleum industry for the past 20 years, directly in the employ of operating companies, and in addition he has handled contract assignments in the East and in the Southwest.

International Trucks for Qualified Civilian Users

The International Models KR-11 (double-reduction drive) and KS-11 (two-speed rear axle) now in production are a part of the limited number of new trucks being built by International Harvester Co. under governmental order for essential civilian users who qualify for new vehicles under ODT priority.

Both models are available in three wheelbase lengths (149, 161, and 197 in.) to meet the varying needs of heavy-duty truck users. Standard equipment includes air brakes and five-speed transmissions (overdrive or direct in fifth). Gross vehicle weight rating of both models is 27,000 lb. Additional 1944 models for civilian users include the K-5, a 1½-ton, medium-duty vehicle and the K-7, rated at 16,500 lb. gross vehicle weight.

All-Plastic Goggles

New all-plastic goggles, "Looks," have been announced by Mine Safety Appliances Co., Pittsburgh. The goggles, featuring light-weight, wide vision and comfort, are suitable for both men and women, and provide durable protection for the eyes, according to M. S. A.

Designed with individual eye cups molded to fit the facial contours, the goggles provide a close yet comfortable seal around the eye orbits. Large aviation-type lenses afford a wide, unobstructed angle of vision.

The strong, clear plastic frame is available in two styles: the general-purpose model, providing direct ventilation through holes at the top and bottom of the eye cups, and the dust model, with indirect ventilation through serrated lens seats. All lenses are of polished sheet acetate, clear or green in color, and are replaceable. A wide elastic headband holds the goggle in place at low tension, assuring wearing ease over long periods of time.

J. E. Swanson Elected Officer by Graver Tank

E. N. Gosselin, president of Graver Tank & Manufacturing Co., Inc., East Chicago, Ind., has announced the election of J. E. Swanson as a vice president of the company. Swanson, who has been with the company for more than 25 years, has served in various executive capacities for the organization, having most recently held the position of general manager of sales.

Bowen Made Vice President Of General Paint Corp.

Milton M. Bowen, Chicago, has been appointed vice president of General Paint Corp. and manager of the eastern division in charge of pipe wrapping. Bowen was previously special representative of Hill-Hubbell & Co. Beginning August 10, he will make his headquarters at the Cleveland office of the company.

Jack Morain, formerly general superintendent, has been promoted to production manager in charge of operations. Morain has been with the company since 1926 and is responsible for a great deal of the design and development of equipment.

The office in Cleveland will be in charge of Miss Frances Tuhey, who has served in various capacities since 1936 and who has been promoted to assistant to the division manager.

The southwest territory will continue to be served by R. A. (Bob) McCarthy, special representative, whose headquarters are in Dallas.

McCarter to Direct Research For Two Companies

W. S. W. McCarter has been appointed director of research and development of Attapulgus Clay Co. and Porocel Corp. He has been research supervisor of the companies for the past 4 years.

Edward R. Galvin Becomes President of Tyson Bearing

Appointment of Edward R. Galvin as president and a member of the board of directors of Tyson Bearing Corp., Massillon, Ohio, is announced by John K. Colgate, former president, who has been made chairman of the board of directors. Earl R. Earnest, executive vice president, also was elected to the board. Galvin formerly was general sales manager of R. G. LeTourneau, Inc., Peoria, Ill., and for 11 years was general sales manager of Carterpillar Tractor Co., also of Peoria.

PERMIAN BASIN

(Continued from page 101)

1372, Blk. 1, EL&RR Sur., elev. 2,981 ft., Yates sand 2,110 ft., solid lime 3,290 ft., dry, TD 4,285 ft.

Winkler County: Sinclair Prairie 1 Seth Campbell, 660 ft. from S and W, Sec. 11, Blk. B-5, PSL, elev. 2,869 ft., anhydrite 1,030 ft., brown lime 2,560 ft., San Andres 3,680 ft., Mississippian 9,150 ft., Silurian 10,130 ft., Montoya 10,505 ft., Simpson 10,895 ft., Ellenburger 12,045 ft., PB 10,325 ft., dry, TD 12,305 ft.

Yoakum County: Plymouth Oil 1 D. K. Woodward, 330 ft. from W, 2,310 ft. from S, Sec. 674, Blk. D, J. H. Gibson Sur. (SW¼ of lease), elev. 3,633 ft., (Permian San Andres) IP 102 bbl. day plus 45 per cent water on pump after acid based on last 3 of 6-hour test, gravity 34, anhydrite 2,340 ft., Yates sand 3,150 ft., brown lime 4,220 ft., San Andres 4,650 ft., show oil 5,285 ft., TD 5,314 ft.

PANHANDLE

AMARILLO.—Pure Oil Co. 1 J. T. Sneed, Jr., Dallam County wildcat, has run and cemented a string of 5½-in. casing at 5,218 ft. with the intention of testing between 5,218-5,390 ft. in the Mississippian formation. With elevation of 4,013 ft., it topped Mississippian at 5,331 ft., the Ellenburger at 6,182 ft., and granite at 6,769 ft. This wildcat was reported abandoned last week, but after running electrical log operators decided to make tests opposite several zones which showed a kick. It is in Section 13, Block 18, CSS Survey.

Hutchinson County.—Humble Oil & Refining Co. 1 S. B. Lasater filled 300 ft. with water from dolomite at 3,310-20 ft., total depth, and has been plugged.

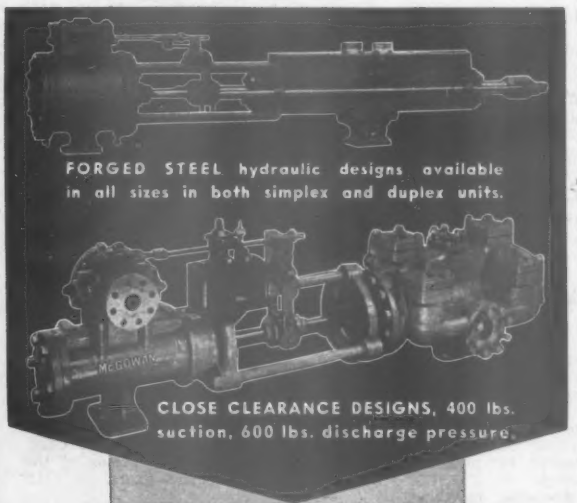
Sherman County. — Kerlyn Oil Co. 1 W. B. Sealy estate, wildcat, will run a string of casing at total depth 4,150 ft. in lime in order to regain circulation and probably will rig up cable tools before drilling ahead on its 5,500-ft. contract.

WILDCAT COMPLETIONS AND DISCOVERIES

	Week ended July 29, 1944					Cumulative total, 1944				
	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ohio	0	0	0	0	0	0	0	9	41	50
Indiana	0	0	0	0	0	3	0	0	13	16
Illinois	1	0	0	5	6	16	0	0	182	198
Kentucky	1	0	0	2	3	6	0	0	38	44
Michigan	0	0	0	7	7	6	0	2	145	153
Kansas	2	0	0	9	11	34	0	5	247	286
Nebraska-Missouri-Iowa	0	0	0	0	0	1	0	0	7	8
Oklahoma	2	0	0	6	8	36	0	17	142	196
Texas:										
North Central	2	0	0	10	12	39	0	1	169	209
West	1	0	0	2	3	17	0	3	95	115
Panhandle	0	0	0	0	0	0	0	0	5	5
Eastern	0	0	0	6	6	4	0	1	80	85
Gulf Coast	0	1	0	9	10	23	9	11	128	171
Southwest	0	0	1	4	5	17	4	12	136	169
Total Texas	3	1	1	31	36	100	13	28	613	754
Louisiana:										
Northern	0	0	0	1	1	3	0	0	32	35
Southern	1	0	0	1	2	5	6	0	33	44
Total Louisiana	1	0	0	2	3	8	6	0	65	79
Arkansas	0	0	0	1	1	2	1	0	31	34
Mississippi	0	0	0	6	6	2	0	0	42	44
Alabama-Georgia-Florida	0	0	0	0	0	2	0	0	12	14
Montana	0	0	0	2	2	2	0	1	19	22
Wyoming	0	0	0	1	1	10	0	1	10	21
Colorado-Utah	0	0	0	0	0	2	0	0	21	23
New Mexico	0	0	0	0	0	3	0	1	35	39
California	1	0	0	5	6	4	0	5	120	129
Total United States	11	1	1	77	90	237	20	69	1,783	2,109
Total previous week	13	0	1	83	97					

SOUTHEASTERN NEW MEXICO

HOBBS. — The new field west of the South Lovington field, Lea County, opened by Fred Turner, Jr. 1-B State, has been officially designated as the Crossett field. Turner 1-C State, ½ mile north of the discovery, was nearing the pay zone as it drilled below 5,074 ft. The deep Ordovician project of Humble 1 Federal-Leonard Oil, in Section 12-26-37, southeastern Lea County, was drilling at 11,260 ft. in shale and sand.


FORGED STEEL hydraulic designs available in all sizes in both simplex and duplex units.
CLOSE CLEARANCE DESIGNS, 400 lbs. suction, 600 lbs. discharge pressure.

McGOWAN PUMPS

for the Petroleum Industry

Dependable since 1852

LEYMAN MANUFACTURING CORP.

The JOHN H. McGOWAN Co. DIVISION

59 CENTRAL AVE. CINCINNATI 2, OHIO

LUBRI-GEL PRODUCTS

On May 16th, 1944, there was issued by the U. S. Patent Office, Patents

2349049

2349050

Which cover the Drilling Mud offered to the trade under the trade names of

LUBRI-SAL

LUBRI-PLASTIC

Lubri-Gel Products intends to consistently follow its established policy of protecting and defending its Distributors, Dealers and Customers against any adverse claims made by anyone for the handling or use of its products.

LUBRI-GEL PRODUCTS

Phone 112 McCracken, Kansas